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A HANDLIST OF
MALAYSIAN MAMMALS

A SYSTEMATIC LIST OF THE MAMMALS OF THE MALAY PENINSULA, SUMATRA, BORNEO AND JAVA, INCLUDING THE ADJACENT SMALL ISLANDS

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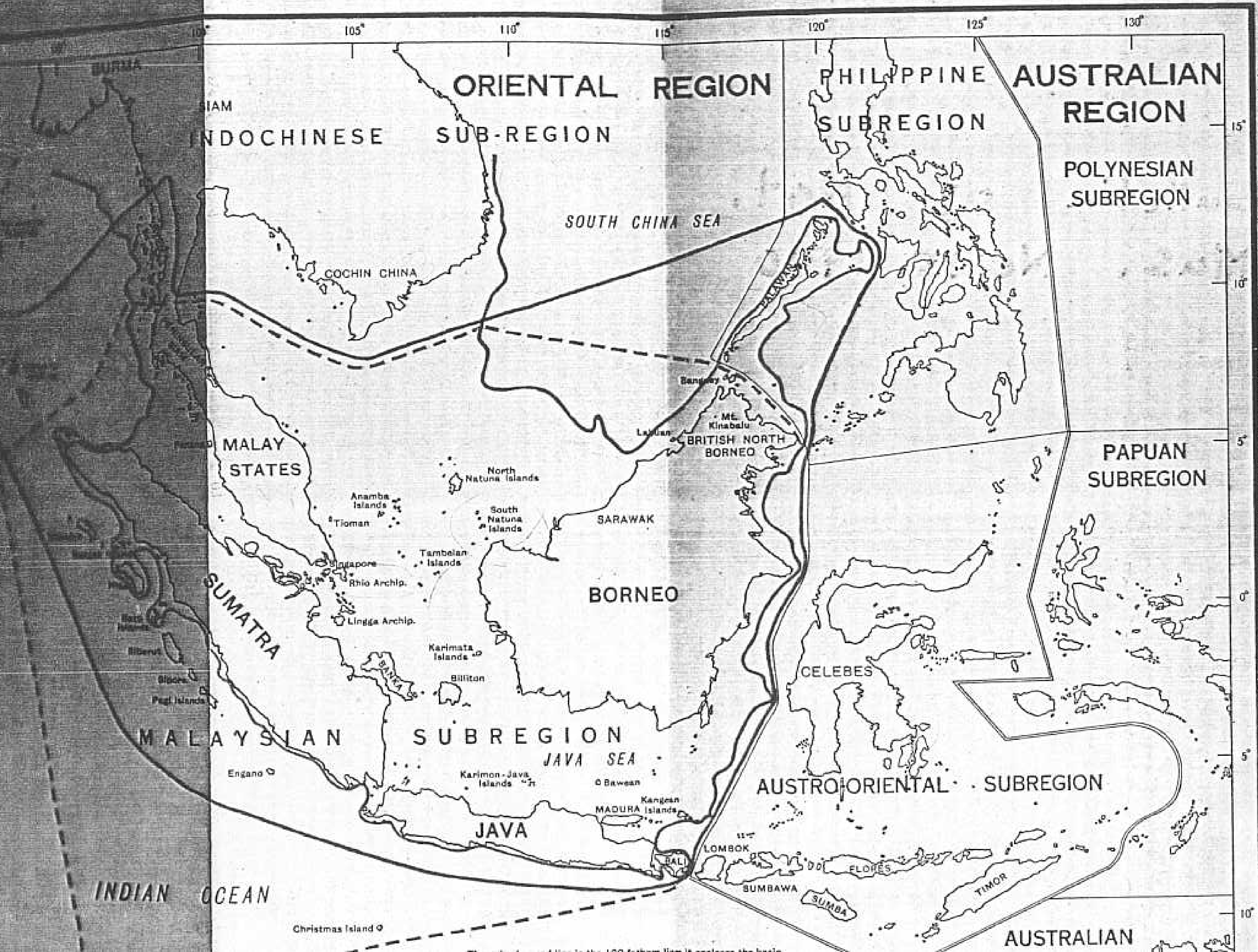

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CONTENTS

ORDERS AND FAMILIES

Page

Order Insectivora 1
- TUPAIIDÆ × .. .. Tree Shrews 1
- ERINACEIDÆ .. .. Moonrats; Short-tailed Shrews 11
- TALPIDÆ .. .. Moles 13
- SORICIDÆ .. .. Shrews 14
- GALEOPTERIDÆ .. .. Flying Lemurs 20

Order Chiroptera × 22
- PTEROPODIDÆ .. .. Fruit Bats 22
- RHINOPOMIDÆ .. .. Mouse-tailed Bats .. 31
- EMBALLONURIDÆ .. Sheath-tailed Bats, etc. .. 31
- MEGADERMIDÆ .. .. False Vampires .. 34
- NYCTERIDÆ .. .. Hollow-faced Bats .. 36
- RHINOLOPHIDÆ .. .. Leaf-nosed Bats 36
- VESPERTILIONIDÆ .. Pipistrelles, etc. 48
- MOLOSSIDÆ .. .. Wrinkled-lipped Bats .. 58

Order Primates 60
- SIMIIDÆ .. .. Orang Utan 60
- HYLOBATIDÆ .. .. Gibbons 63
- CERCOPITHECIDÆ .. Macaques 65
- COLOBIDÆ .. .. Leaf Monkeys 70
- TARSIDÆ .. .. Tarsiers 86
- LORISIDÆ .. .. Lemurs 88

Order Carnivora 89
- URSIDÆ .. .. Bears 89
- MUSTELIDÆ .. .. Martens, Weasels, etc. .. 90
- CANIDÆ .. .. Dogs 93
- VIVERRIDÆ .. .. Civets, etc. 94
- FELIDÆ .. .. Cats 104

CONTENTS

Page

Order Cetacea 108
BALAENIDÆ .. .. Whalebone Whales .. 108
PHYSETERIDÆ .. .. Sperm Whales 109
DELPHINIDÆ .. .. Dolphins, Porpoises .. 109

Order Edentata 111
MANIDÆ .. .. Scaly Anteaters .. 111

Order Rodentia 111
LEPORIDÆ .. .. Hares 111
SCIURIDÆ .. .. Squirrels 112
SPALACIDÆ .. .. Bamboo Rats 150
MURIDÆ .. .. Rats, etc. 151
HYSTRICIDÆ .. .. Porcupines 187

Order Sirenia 189
DUGONGIDÆ .. .. Dugong 189

Order Ungulata 190
ELEPHANTIDÆ .. .. Elephants 190
SUIDÆ .. .. Pigs 190
TRAGULIDÆ .. .. Mouse Deer 193
CERVIDÆ .. .. Deer 201
BOVIDÆ .. .. Oxen 204
RHINOCEROTIDÆ .. Rhinoceroses 207
TAPIRIDÆ .. .. Tapirs 207

INTRODUCTION.

I. ZOO-GEOGRAPHICAL.

Malaysia is here regarded as a sub-region of the Oriental Region, embracing the Malay Peninsula, Sumatra, Borneo, Java and all the adjacent small islands.

To the faunist this restricted Malaysia is more homogeneous than the larger sub-region *Indo-Malaya* of Wallace, within which the Philippines are sharply divided from the Malay Peninsula and Sunda Islands.

Excluding the Palawan group and Sibutu, the Philippine Islands lie outside the 100 fathom line. Their fauna is poor compared with that of Malaysia. It lacks many Malaysian genera, but on the other hand includes many peculiar forms.

The exact boundaries of a zoo-geographical zone must always be of an arbitrary nature, and as it is obvious that such a zone is basically physiographical, rather than zoological, it is reasonable to try to fix its natural boundaries with regard to geographical facts and then, as Kloss has observed, to regard as anomalous any zoological features that do not conform, and to seek an explanation for the latter.

A basic, or physiographical Malaysia can soon be defined as all land standing on the Sunda Shelf below about Lat. 10° N. It is an area in which the sea-depths are less than one-hundred, and usually less than forty fathoms: it leaps to the eye from a bathymetrical map.

As a zoo-geographical zone of any kind, however, the unmodified Sunda Shelf is not satisfactory and it needs modifications on zoological and geographical grounds, as well as on those of expediency. For instance, on zoological grounds a case can be made out for including Tenasserim to about the latitude of Tavoy in a northern extension on the *western* side of the Peninsula. The Nicobar Islands also have a strong claim to inclusion, but it has been thought expedient to exclude both Tenasserim and the Nicobars. They are fully covered by regional publications dealing with British India, and their inclusion would be undesirable bibliographically; furthermore, I have no collections or detailed knowledge of these areas.

On the other hand the Sunda Shelf includes the Palawan group of islands and Sibutu of which the fauna is strongly Bornean with a conspicuous Philippine element. As these islands are also politically Philippine and fully covered by other publications they are excluded from the present work.

Lastly, entirely on grounds of geographical proximity the Cocos-Keeling Islands, and Christmas Island in the Indian Ocean are included, although the fauna of the former is *Oceanic*, and of the latter, largely *Austro-Oriental*.

GENERAL FEATURES OF THE MALAYSIAN MAMMAL FAUNA.

This book is concerned with recent mammals only. For the Malay Peninsula there is little else to record, and teeth of the Pleistocene *Elephas "namadicus"* are the only fossil vertebrate remains I have seen from the Peninsula. In Java, rich Pliocene and Pleistocene mammal faunas with both Indian and Chinese affinities have been discovered and studied (see especially von Koenigswald, Proc. Kon. Akad. Weten. Amsterdam, XXXVIII, 1935, p. 188). A "prehistoric" fauna associated with neolithic man in the Malay Peninsula includes extant forms only, but the collections so far are meagre. The neolithic in the Peninsula probably extended well into the Christian era. In Java, similar but much larger collections have been revealed. The deposits seem to be only three or four thousand years old, but they include the remains of *Cervus eldii* and *Elephas,* neither of which is now found in Java.

The present Malaysian mammal fauna is fairly even, pointing to land connections geologically not remote. Nevertheless, subspecies of varying degrees of distinctness are usually developed on each of the large land-masses.

Broadly speaking the faunas of the Malay States and Sumatra are much alike; those of Java and Borneo are more specialised and different.

The affinities of the extant mammal fauna of Malaysia are largely with the continental Indo-Chinese sub-region, and the Philippine sub-region. Excluding some weak links on the eastern boundary, there is little affinity with the Austro-Oriental sub-region lying on the other side of Wallace's Line.

The fauna is more or less sharply divided at about 3,000 feet, but a small group of submontane forms does not conform. The montane forms may, or may not, be representatives of species occurring in the lowlands. Usually they are not, but sometimes the high-level form seems to be only a *subspecies* of its lowland neighbour, the two being linked by a minority of specimens intermediate in appearance.

Occasionally a close relationship cannot be disputed, but the absence of intermediates, coupled with a greater degree of divergence in appearance than in the case of the subspecies, causes the systematist to hesitate in the use of trinomials, and although the highland and lowland forms are mutually exclusive altitudinally, we speak of *representative species.*

Ignoring all details, the following is a very broad appreciation of the extant mammal fauna. A now purely Sondaic element (predominantly montane); much stronger in Borneo than elsewhere, for this island seems most favourably constituted for the retention of old and the production of new animal forms, may or may not be common to all three Sunda Islands.

A much larger association can be regarded as the *Malaysian*; or taking a broader view the *Indo-Malayan* element. The species are often spread over the whole sub-region, but in many cases they are absent from Java.

Northern influences from the Indo-Chinese sub-region are apparent in western and eastern drifts. In the case of some purely continental species of the western drift, the southern limit is on various latitudes in the Malay Peninsula. Montane and lowland forms probably mark older and more recent movements respectively: some species, *e.g. Bos gaurus*, seem to be very recent arrivals. Other Indo-Chinese ("Himalayan") species extend to Sumatra, or even further.

The eastern drift entered by way of Borneo where many of the species stopped; but others went on to Java. A few reached Sumatra and turning to the north along the edge of the Sunda shelf, certain of these eastern forms established themselves on the Mentawi Islands off the west coast of Sumatra.[1] It seems not improbable that even the Malayan fauna has received additions from across the Straits of Malacca.

In the recognition of these two northern influxes, originating at different points, but often including representatives of the same species, I find a feasible explanation of many of the puzzling points raised by the present distribution of mammals in Malaysia.

Eastern and western branches of the same species are always at least subspecifically distinct, and often widely divergent in appearance. The southern limit of each wing is very variable. *Bos sondaicus* for instance only reaches the north of the Malay Peninsula, but in the east it is found in Borneo and Java: it has not spread to the south of the Peninsula, or to Sumatra.

In certain cases the ends of the two streams seem to have mixed, and then we find two "species" differing from each other in characters that can be described, although vaguely, as quantitative rather than qualitative, existing side by side on one, or more, of the land masses. Physiological intolerance must here have played a part in perpetuating the differences between the stocks, once so closely related.

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[1] One of the most interesting zoological specimens I have ever handled is a pale (mostly cream and tawny) aberration of the curious pig-tailed langur, *Simias concolor*, from the deep-water Mentawi Islands, off the west coast of Sumatra. This isolated genus, so unlike any other known monkey genus, with its retroussé nose, short and almost naked tail, dark pelage, and blackened hands and feet has long been a mystery to zoogeographers, but I now see that the aberration reflects the actual *colour pattern* and colour of the Proboscis monkey of Borneo, *Nasalis larvatus*, which can now be accepted as a direct link between *Simias* and certain eastern Indo-Chinese species. Most of the Mentawi mammal forms are characterised by their very dark colour, and we know that the tail is a very plastic organ in monkeys, but I am sure that few observers confronted with normal skins of *Simias* and *Nasalis* would venture to suggest any close relationship.

It is significant that in such pairs the least widely spread species (maybe it is absent from Java, the separation of which is usually regarded as having taken place earlier than the severance of many other land connections in Sundaland) is usually less common, has developed fewer subspecies, and is less adaptable ecologically, than the commoner, more widely spread form.

I should not, however, in all cases ascribe to the mingling of the two drifts of the Indo-Chinese stream, this very noticeable phenomenon of "pairs", for in some cases it seems more likely that one species may be, for want of a better word, the antediluvian representative of a second form still purely Malaysian in distribution, and possibly of local origin.

In a number of instances a species is commonest on the extreme distal limit of its range, and then there is usually a gap in the distribution, occurring between it and its relatives living nearer to the supposed point of invasion. A somewhat similar condition is presented by some Malaysian birds which occur, mainly, as winter migrants from the north. These species have in a number of cases established breeding resident races on the southern periphery of the specific range.

I am inclined to think that the importance of ancient land connections in accounting for the present distribution of animals has been overstressed by some zoo-geographers of Malaysia. On the Sunda shelf the sea distances are never very great, and having seen the vegetation-covered floating islands, broken away from river banks by floods, going down river past Palembang on the east coast of Sumatra, I am prepared to believe that, on a basis of geological time, there are few things that we cannot assume to have happened in the way of dispersal by currents, wind and adventitious means. There are certainly signs that the relatively narrow seas have not prevented the mingling of the existing faunas where they face each other.

It is still too early to base any analysis of Malaysian faunas on the entire contents of published lists of any given area, for it is certain that these lists still do not fairly represent the facts. Only the well-known species can be used in a serious study, for our knowledge of the others is incomplete. It is only a few years ago that a big pig was added to the list of Malayan mammals; within a few years a curious murine genus described from a small island off the west coast of Sumatra was demonstrated to occur on all four Malaysian land masses; only last year I described a new bat from Java and had to refer it to a South Indian genus; it is not very long since *Rhinoceros sondaicus* was revealed in Sumatra; and recent collections from the mountains of North Sumatra contain a striking and entirely new species of rat as well as specimens extending the range of other Malaysian forms. Our knowledge of the bats, insectivores, and small rodents is, assuredly, still far from complete and the observations in the following pages exclude consideration of these groups.

It has always seemed to me that another factor of prime importance in distribution is the presence or absence of the urge to spread. Migratory birds will follow ancient but obliterated coast lines and even on continuous land surfaces Malaysia presents many instances of mammal species which will not pass a certain line although to human eyes the habitat on both sides seems ecologically quite similar. Sometimes the narrowest strip of water seems to inhibit the passage of even birds, more completely than apparently far more formidable boundaries in other cases.

* * * *

It is convenient to recognise four *Provinces* in Malaysia, and although this arrangement is largely natural, that is to say, in close agreement with both zoological and geographical facts, and provides a simple arrangement, it is not altogether satisfactory in that the four provinces are certainly not equal in value.

THE MALAYAN PROVINCE.[1]

The Malay Peninsula; the small islands close to both its coasts; the Anamba and Tambelan Islands in the South China Sea.

The northern boundary of this province, and consequently that of the sub-region is here regarded as Lat. 10° N. which is at the narrowest part of the Isthmus of Kra. Any further extension embraces territory within the political limits of British India. The adopted dividing line is, furthermore, not unnatural, for although on the west coast along the region of the heavier rainfall and evergreen forests Malaysian species often extend through Tenasserim to about the latitude of Tavoy, the Pakchan Estuary seems to constitute a real faunal boundary for many birds and mammals, especially on the east coast. A herpetologist would draw the southern line of his Indo-Chinese fauna at about Lat. 12° N. for by raising it from 10° N. about a dozen Malayan species of amphibians and reptiles are excluded.[2] A botanist suggests that the division should be at about the latitude of Singgora in Peninsular Thailand, and that an intermediate area more Indo-Chinese than Malayan lies between Lat. 7° N. and 10° N.[3] Little is known of the mammals of the high mountain range between Tenasserim and Thailand.

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[1] Basic literature of the Malayan Province.—Kloss, Journ. F. M. S. Mus. II, 1908, p. 147 (a list); *id.* p. 151 (list of bats); *id.*, Journ. Strs. Br. R. A. Soc., No. 53, 1909, p. 1 (primates, carnivores and ungulates); and very many short papers, mostly by Robinson and Kloss, in Journ. F. M. S. Mus. I–X, 1905–22 wherein the mammal faunas of most of the Malayan coastal islands are discussed, the most important being III, 1908, p. 101 (Tioman group), IV, 1911, p. 175 (Trengganu Arch.), and V, 1915, p. 128 (islands in the Bandon Bight). For the Anamba Islands see Chas. and Kloss, Journ. Malay. Br. Roy. Asiat. Soc, pt. 3, 1928, p. 28.

The distinctness of the mountain faunas throughout Malaysia has already been mentioned above. In the Malay Peninsula, as elsewhere, the dividing line is at about 3,000 ft. A Himalayan element (*e.g. Rattus bowersi, Tamiops, Dremomys rufigenis, Sciurus erythraeus*) is the dominant feature of the high-levels in Perak, Pahang and Selangor, but it fades out in the south, and is absent in Negri Sembilan and on the Johore hills; it is also weak on the isolated summit of Kedah Peak in the north.

Occasionally the mountain species are differentiated into northern and southern forms (*e.g. Sciurus tenuis*).

In the lowlands some true Malaysian species (*e.g. Sciurus notatus, Sciurus hippurus* and *Rhinosciurus tupaiodes*), on the eastern side of the Peninsula, are very near their northern limit in the Thai province of Bandon, but on the west coast this fauna extends further to the north.

In the lowlands the fauna is not homogeneous for certain continental species occur in the north but not in the south (*e.g. Menetes berdmorei, Macaca speciosa*) ; on the other hand many Malaysian forms are found only in the southern two-thirds of the Peninsula.

Subspecific variation is basically latitudinal, which is interesting in view of the fact that the main physical feature of the Peninsula is a high range of mountains running north and south, like a backbone, down the Peninsula. Many species widely spread in the Peninsula can be separated into northern and southern races, and in some species more than two subspecies can be recognized. In these cases there is usually, but not always, a third form in the extreme south. This southern area is also marked by the absence of some otherwise common Malayan mammals (*e.g. Sciurus prevostii, Sciurus concolor*).

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[2] *See* Malcolm Smith, Faun. Brit. Ind., Reptiles and Amphibia, I, 1931, p. 13.

[3] Ridley, Journ. Strs. Br. Roy. Asiat. Soc. 59, 1911, p. 55.

Most of the subspecies are solely Malayan, *i.e.* restricted to the Peninsula, but these are usually very like other forms found in East Sumatra and Borneo. No Malayan form could be called strikingly distinct from all its extralimital neighbours: *Pithecus obscurus* is, perhaps, the most distinct. Further, if the arrangement in the following pages is accepted, the Peninsula has no peculiar genus, or species.

It is true that I have regarded *Pithecus obscurus* as a species, but I am not very familiar with the Indian langurs, and I suspect that *obscurus* is merely the southern representative of the continental *barbei*.

In the Peninsula are found a number of species not found elsewhere in Malaysia. All are immigrants from the north (*e.g. Bos gaurus, Rattus bowersi, Rhizomys pruinosus, Dremomys rufigenis, Sciurus erythraeus, Sciurus caniceps, Viverra megaspila, Viverra zibetha, Macacus speciosa*). Two genera (*Menetes* and *Tamiops*) are in the same category. All the foregoing are unaltered or altered southern forms of more northern mammals. Their extreme southern limit is variable: *Viverra zibetha* occurs as far south as Singapore.

The faunal convergence at the extremities of the Ceylon-Burma-Malayan-arc is as well known as are the several theories put forward to account for the phenomenon.

The coastal islands of the Peninsula are usually inhabited by subspecies slightly differentiated from those of the opposite mainland. In most cases those found on the east coast islands are more distinct than those on the west. The finding of the rare, montane insectivore *Hylomys* on Tioman was unexpected, but otherwise the mammal faunas of all these small islands present no anomalous feature: the forms have obviously been derived from the nearest mainland, or neighbouring small islands. In the Tioman group an affinity with the nearer islands of the Rhio Archipelago is noticeable.

In the Anamba Islands the mammals are only rarely inseparable from those of the mainland; the faunal affinities are with the Malay Peninsula rather than with the neighbouring North Natuna Islands. The Tambelan Islands between Singapore and Borneo, and situated nearer to the latter, have an impoverished fauna of no special interest beyond the presence of insular races of *Sciurus prevosti* indicating affinity with some other small island groups in the South China Sea rather than with the Malay Peninsula.

THE SUMATRAN PROVINCE.[1]

Sumatra and the shallow water islands off its east coast with which the islands of the Rhio and Lingga Archipelagos are intimately related. The large islands of Banka and Billiton. The chain of islands off the west coast of Sumatra, the most important of which, from north to south are Simalur, the Banjak Islands, Nias, the Batu Islands, the Mentawi Islands (Siberut, Sipora, and the Pagi Islands), and Engano.

The mammal fauna of the main island of Sumatra is closely allied to that of the Malay Peninsula. Some of the continental forms are missing (*e.g. Bos gaurus, Rattus bowersi, Tamiops, Sciurus caniceps*), but others, absent from Borneo and Java, are shared with the Peninsula (*e.g. Tapirus, Capricornis, Aetherus, Hylobates symphalangus*). On the other hand Sumatra and Borneo have in common a Sondaic element lacking on the continent (*e.g. Tupaia tana, Hystrix crassispinis, Sciurus albescens, Simia satyrus, Tarsius*). In this connection the islands of Banka and Billiton are demonstrable links between the two larger islands, although even on the former, so close to the coast of Sumatra, there is a Bornean species, *Tupaia gracilis*, not yet found in Sumatra. An isolated Java-Sumatran element is barely demonstrable although the murine genus *Mycteromys* as yet has been found on these two islands only.

There is, however, in Sumatra a peculiar hare, *Nesolagus netscheri*, not found elsewhere, and with its nearest allies in the foot-hills of the Himalayas (north-east).

A strong faunal boundary that cleaves the island from north to south is the Barisan Range, a depression in which, at Lat. 1° 30′ N. (Padang Sidempuan), also seems to act as a faunal boundary. There is much specific variation among Sumatran mammals. A main racial division is north against south, but often the forms on the alluvial flats of the east coast differ from those inhabiting the older land west of the mountains. Northern forms may approximate to, or be inseparable from, Malayan races.

The low-lying islands on the east coast of Sumatra call for no special remark. The maze of small islands known as the Rhio-Lingga Archipelago has a mammal fauna poor in species, but extraordinarily rich in subspecies. The species are those common to the south of the Malay Peninsula and the lowlands of Central-East Sumatra, but the Sumatran affinity is the stronger of the two.

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[1] The basic literature for this province is, or is summarized in, the following papers.—Rob. and Kloss, Journ. F. M. S. Mus. VIII, pt. 2, 1918, p. 1 (Sumatra); Lyon, Proc. U. S Nat. Mus. 52, 1916, p. 437, and Chas. and Kl., P. Z. S. 1928, p. 53 (West Sumatran Islands); Dammerman, Treubia, VII, 1924, p. 281 (Rhio-Lingga Arch.); and Sody, Temminckia, II, 1937, p. 221 (Banka).

The islands of the West Sumatran chain are of special interest, for they contain many well-marked forms. In their faunas these islands vary much among themselves, and sometimes from Sumatra. There is no proof that the island chain ever formed one land-mass, or that all the islands were ever joined to Sumatra. The archipelago cannot be treated as an entity, and there is reason for regarding the deeper water islands (Simalur, the Mentawi Islands and Engano), as forming a zoogeographical province, small in area, but equal in value to any of the four other provinces here adopted. The subspecies on the islands within the forty-fathom line, the Batu and Banjak Islands, are not so distinct as those on the deeper water islands; and neither are the forms on the medium-water island of Nias so well marked as in the Mentawi Islands. These latter islands have a most interesting mammal fauna which includes a curious genus of leaf-monkeys (*Simias*), a remarkably distinct gibbon, a very distinct langur (*Pithecus potenziani*), and other striking forms.

THE BORNEAN PROVINCE.[1]

Borneo and its coastal islands, the most important of which are Labuan, and Mantanani off the north-west coast; Maratua off the east coast; and Pulau Laut off the south-east corner. The North Bornean Islands of Banguey, Balambangan and Mallewallé; the North and South Natuna Islands; the Karimata Islands.

The outstanding feature of the mammal fauna of Borneo is that it is far more specialised than that of any other Malaysian province. Neither in the mountains nor in the lowlands is the fauna even, and there are several obvious faunal boundaries in the island. One of these is formed by the high mountain ranges of the interior, the general strike of which is in a north-east and south-west direction. In some species a race found east and south of the mountains is separable from another found, broadly speaking, in Sarawak. In some other cases, races are distributed approximately as above, but meet on the northern coast (north-western) in the neighbourhood of Baram where there is an important faunal boundary. Sometimes a purely northern race has a limited distribution extending only from the barrier last mentioned across the territory of British North Borneo and a short way down the east coast.

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[1] Basic literature for this province from the systematic view-point can be obtained by reference to Lyon, Proc. U. S. Nat. Mus. 40, 1911, p. 53 (South Borneo); Gyld., Kungl. Sv. Vet. Akad. Handl. 60, 1919, p. 1 (a list); Chas. and Kl., Bull. Mus. 6, 1931, p. 1 (North Borneo and islands); Banks, Journ. Mal. Br. Roy. Asiat. Soc. IX, 1931, p. 1 (Borneo, general); Chas., Bull. Raff. Mus. 10, 1935, p. 5 (Natunas); Chas., Treubia, XV, 1935, p. 1 (Karimata Islands).

Within the major divisions given above, limited areas in the lowlands of south, and west Borneo also tend to produce subspecies. Sometimes certain rivers running west and east act as boundaries for subspecies. Turning to the mountains we find that the great massif of Kinabalu in the north has its own peculiar forms, and it shares others with certain other high peaks: among these latter there are signs of independent specialisation on Mt. Dulit in North Sarawak. A few montane forms occur also on the isolated peaks of Poi and Penrissen in the north-west corner of the island: the form is usually that found on the northern mountains but, rarely, distinctive subspecies have developed.

Noteworthy among the Bornean mammals are species of Indo-Chinese origin. These may (*Helictis, Bos sondaicus*), or may not (*Nasalis, Dremomys, Dendrogale*) reach Java.

Borneo has a large number of mammal forms not found elsewhere: it is my belief that a majority of these is of local origin. A small element is shared with the Philippines (*e.g. Nannosciurus exilis*). Species common to Borneo and Sumatra are relics (*Tarsier, Simia*), or purely Sondaic (*Sciurus albescens*). A few forms are common to all three Sunda Islands (*e.g. Rattus infralutens, Mydaus, Pithecus aygula*).

The coastal islands of Borneo have their own subspecies in a number of cases, but these are never more than slightly differentiated from those of the mainland.

The mammal fauna of the Karimata islands seems to be Bornean in origin, but the local subspecies are sometimes very well marked.

Although closely associated in name the North and South Natuna Islands have little in common faunistically. The southern group is essentially Bornean in its affinities, a relationship primarily indicated by the presence of *Tarsius* and *Tupaia tana* on Sirhassen Island, and emphasised by the facies of the local forms of *Ratufa affinis* and the two *Tragulus*.

The northern islands are also linked to Borneo by *Mydaus* which occurs in both places, but in general the subspecies of Bunguran are dissimilar to those inhabiting the nearest Bornean mainland. In a number of cases they bear a strong resemblance to the races on Bintang Island in the Rhio Archipelago.

THE JAVAN PROVINCE.[1]

Java with Madura; Bali. Many small islands in the Java Sea, the most important of which are the Thousand Islands; the Watcher Islands off Batavia; the Karimon-Java Islands; Bawean; the Kangean Islands, including Raas and Sapudi; various small islands between Bali and Borneo, the most important of which are Arends, Solombo, Kalambau, and Mata Siri. Christmas Island in the Indian Ocean. The Cocos-Keeling Islands.

The mammal fauna of Java is poorer than that of the two other Sunda Islands, a circumstance perhaps due to the small area of the land. In almost all cases a Javan subspecies can be recognised; sometimes the local forms are not strikingly different from subspecies found in other parts of Malaysia, but in other cases they are widely divergent.

The broad basis of subspecific variation is longitudinal, and several of the species are represented by western and eastern races. Owing to lack of material I cannot venture an independent opinion on the validity of a number of forms recently described from Java. According to one estimation no less than six races of *Sciurus notatus* are found on the island, and a number of species are represented by three races. Mr. H. J. V. Sody has postulated an area of racial differentiation in the centre of the north coast where "sub-insular status" is suggested for Mt. Moeriah.

The majority of the Javan forms are representatives of more widely spread Malaysian species mostly occurring on all four land masses, but sometimes with a more restricted range. Some of these latter, not occurring in Borneo, are members of the western drift from the continent by way of Sumatra (*e.g. Sus cristatus, Felis tigris, Cuon javanicus*).

On the other hand, Java shares with Borneo *Bos sondaicus* and *Helictus*, genera not found in Sumatra or the Malay States: no doubt they reached Java from Indo-China by the eastern drift, another member of which, *Pithecus aygula*, went on to Sumatra. Of the purely Sondaic forms some are shared with the two other Sunda Islands (*e.g. Mydaus, Rattus infraluteus, Nannosciurus melanotis*); or with Sumatra alone (*e.g. Tupaia javanicus*). The Malaysian status of both the species (*Herpestes javanicus, Felis pardus*) common to the Malay Peninsula and Java, but not found in the other Sunda Islands, is doubtful. In the case of

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[1] Basic literature for the Javan Province. Java.—A series of papers (incomplete, 1940) started by Dammerman in Treubia, XIII, 1931, p. 429; Dammerman, Treubia, XI, 1929, p. 1 (a list); Sody, Tectona, XXXI, 1938, p. 741 (a list). Bali.—Sody, Natuur. Tijdschr. Ned. Ind. XCIII, 1933, p. 56.

the leopard I am still a little doubtful as to whether it is rightly omitted from the Sumatran list. Four striking forms are found in Java and not elsewhere in Malaysia. Of these, *Lepus nigricollis* is almost certainly an introduction; and the status of *Felis viverrina* is not above suspicion. *Sus verrucosus* and *Mustela lutreolina* are endemic Javan forms. The former I regard as a western outlier of a more eastern group; the latter is likely to be overlooked and it will probably turn up elsewhere in Malaysia. The mammal fauna of West Java is richer than that of the East.

Slightly marked subspecies of some common Malaysian forms are found on various small islands in the Java sea. Bali too has a few insular subspecies, and on Bawean Island lives the small deer *Cervus kuhlii*, a form of which my knowledge is very superficial.

The fauna of Christmas Island in the Indian Ocean is highly specialised. The indigenous birds are Austro-Oriental in their affinities, but the mammals also reflect a Malaysian influence. The mammal fauna of the Cocos-Keeling Islands consists of introduced, and adventitiously occurring Malaysian and Christmas Island forms.

II. ARRANGEMENT, ETC.

This handlist is based primarily on an examination of specimens, and to a much lesser degree on literature. In addition to the collections in the Raffles Museum much of the relevant material in the museums of London, Leyden, Buitenzorg and Kuching has been examined, as well as important specimens in some other museums in Europe. Unfortunately I have not yet been able to visit the United States National Museum wherein are important Malaysian collections.

The synonymy is purely regional, and excludes extralimital synonyms. The majority of the references have been checked in the original publication, but the library in Singapore although fair is far from complete, and often I have had to obtain a reference from a secondary source, in which case I have tried to avoid the works of mere copiers. A number of *nomina nuda* have been excluded as they never seem to have crept into literature. Almost needless to say, Sherborn's *"Index Animalium"* has been of the greatest use.

I regret that the index is so brief. I should have liked to provide a full index as in my "Handlist of Birds", but towards the end of the work the need to economise arose.

In the method of spelling place names I have, at times, been inconsistent and in the case of small places in Netherlands India I have often followed the Dutch system. There would, for instance, have been little point in anglicising the numerous names I have mentioned in my excursus on *Pithecus*, for some of these localities are not marked on any English map known to me. The new Dutch "Atlas van Tropisch Nederland" (1938) is indispensible to a zoologist in Malaysia.

The references given in the footnotes are often merely suggestive. At times they may seem, at first glance, relatively unimportant, but it will be found that they usually quote the essential literature on the group, or region.

An asterisk in front of the name means that topotypes have not been examined. In the great majority of cases these forms have been accepted. They are mostly based on islands off the west coast of Sumatra (excluding the Mentawi Islands).

In this list a very broad view of a "species" is taken and there is an extensive linking of geographical races and representatives in the German fashion. *Species* is here used in the *formenkreise* sense. Many of the combinations adopted are novel. In the matter of genera I have been very conservative and have "lumped" extensively.

In any attempt at the reduction of genera the factor of colour-pattern should surely not be ignored, for it seems to be a deep-seated character; but if this factor is superimposed on the divisions already proposed, based on anatomical differences, the result among mammals and birds is almost invariably monotypic genera. In the few cases in which groups of species have emerged (but far more usually "pairs" emerge) from such detailed treatment, a good case can usually be made out for considering one to be a more recent arrival on the territory of another.

In Malaysia the mammals have been much more plastic than the birds, and in some cases the species are so broken up that a list of the subspecies is little more than a list of the small islands on which the species is found. In many cases small islands with an avifauna showing little or no differentiation from that of the nearest large land-mass, have developed a number of very distinctive mammal races. Among the maze of islands just south of Singapore known as the Rhio-Lingga Archipelago are scattered nine forms of *Tragulus javanicus*, some very distinctive in appearance. For instance, on Bulan Island is a pale rufous animal, brightest on the nape, and with a bold yellowish rufous colour-pattern on a white throat. Less than twenty-five miles away, Kundur Island is inhabited by a much darker form in which the neck is almost solidly black!

Throughout Malaysia the small islands show a relatively greater tendency to produce subspecies than do the large land-masses. On the former the biological discipline seems less severe and variation is perpetuated; on the latter it is absorbed.

Some collectors still use alcohol or formalin as an initial preservative for mammal skins in the field, but material so preserved is useless for critical colour comparison. Often the colours are not changed, but sometimes they are, and then unfortunately in a subtle manner that produces a "natural" result. Monkey skins dried from such preservatives are not infrequently slighter paler than they should be, and squirrels and tree-shrews tend to become deeper brown on the back. Deep chestnut parts of the pelage are altered in the direction of maroon; but kindred colours paler than chestnut may be bleached. Some collectors have maintained that colour is not affected by alcohol, but when collections are submitted to me for examination I find that I can usually pick out the skins that have suffered immersion, and in consequence submit that a note recording such treatment should always be added to labels.

The descriptions of thirty-nine new forms appear in the following pages.—*Tupaia glis cognata* (p. 9), *Tupaia glis umbratilis* (p. 9), *Hylomys suillus tionis* (p. 12), *Talpa klossi malayana* (p. 13), *Megaderma spasma abditum* (p. 35), *Megaderma spasma kinabalu* (p. 35), *Rhinolophus philippinensis sanborni* (p. 39), *Hipposideros diadema natunensis* (p. 43), *Tylonycteris malayana* (p. 52), *Eptesicus verecundus* (p. 53), *Kerivoula papillosa malayana* (p. 55), *Pithecus femoralis paenulatus* (p. 75), *Pithecus femoralis fluviatilis* (p. 76), *Pithecus obscurus seimundi* (p. 80), *Nasalis larvatus orientalis* (p. 84), *Tarsius tarsier natunensis* (p. 86), *Petaurista petaurista stellaris* (p. 113), *Iomys horsfieldii penangensis* (p. 115), *Hylopetes sagitta sipora* (p. 117), *Sciurus prevostii baramensis* (p. 131), *Sciurus nigrovittatus venetus* (p. 139), *Rattus rattus robinsoni* (p. 154), *Rattus rattus perhentianus* (p. 155), *Rattus rattus pemanggis* (p. 156), *Rattus mülleri credulus* (p. 162), *Rattus sabanus dictatorius* (p. 165), *Rattus sabanus salanga* (p. 166), *Rattus surifer puket* (p. 169), *Rattus surifer telibon* (p. 170), *Rattus surifer muntia* (p. 170), *Rattus surifer pidonis* (p. 171), *Rattus surifer natunae* (p. 173), *Rattus rapit cameroni* (p. 176), *Rattus whiteheadi piratae* (p. 181), *Rattus whiteheadi subitus* (p. 182), *Tragulus javanicus hendersoni* (p. 196), *Tragulus kanchil insularis* (p. 198), *Tragulus kanchil pidonis* (p. 198), and *Tragulus kanchil pumilus* (p. 199).

III. ACKNOWLEDGEMENTS.

I cannot conclude this introduction without acknowledging my indebtedness to my former chief and predecessor, Mr. C. Boden Kloss, who first introduced me to the study of systematic mammalogy. Together with the late H. C. Robinson he is responsible for the accumulation of a large part of the unrivalled collections now under my charge in the Raffes Museum.

Mr. E. Banks, Curator of the Sarawak Museum is always a most helpful colleague. He invariably places the State collections at my disposal in a most generous manner, and by doing so has brought us much nearer to an exact appreciation of Bornean mammals.

The officials in charge of the Zoological Museum at Buitenzorg in Java have been equally helpful, formerly Dr. K. W. Dammerman, and latterly the present custodian, Mr. M. A. Lieftinck. The close but quite unofficial relations existing between this group of three museums working under entirely distinct administrations is a pleasing feature of museum life in the East.

In London, Mr. F. C. Sawyer and Dr. C. D. Sherborn have kindly checked some references for me.

F. N. CHASEN.

SINGAPORE, *April*, 1940.

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[1] When he retired from service in the East in 1926 the late H. C. Robinson took to Europe part of the local collection of mammals with the intention of using it as a basis for a book on Malayan mammals, but he died soon after and the material passed to the British Museum. As workers in Europe are beginning to use this collection a few words about it will not be out of place.

The skins taken to London represent only a part, and by no means the largest or most important part, of the collections once housed in the museum at Kuala Lumpur, Federated Malay States. The bulk of those collections, together with the Raffles Museum material remains under my charge in Singapore. It is, therefore, incorrect to assume that any published opinion, or observation by Robinson, Boden Kloss, or myself is based solely on the skins now in London, for in most cases much more extensive material has been studied. For instance, in Mr. R. I. Pocock's 1934 review of *Pithecus pyrrhus* it is quite wrongly assumed that Kloss' published remarks are based entirely on the series now in London.

Unless the labels on the skins specifically quote the collectors the identity of the latter should never be assumed. In too many cases to mention in particular, Robinson and Kloss have now in published papers been given the responsibility of measurements never taken by them, and of collecting in localities they never visited.

While on the question of measurements it should be mentioned that the method of taking them was not identical over the long period of years during which the collections were formed, and the detail of the individual labels should always be observed. When I worked with Kloss he always took the total length and tail measurements in the field. In working out the collections later it was always easy to subtract the last named measurement to get the figure for the head and body. This method leaves less room for error than does Robinson's early practice of taking two separate measurements for head and body, and tail, in the field.

Few collections could have been more carefully labelled than were the skins in question, but most unfortunately some of the later collected skins had only field labels and these labels, plus some of the others now greasy or faded, are giving a lot of trouble. The localities are being published often without reference to a map and some of the errors of transcription are so grievous that they are almost unrecognisable even to readers familiar with the ground.

A further point occurs in connection with the citation of localities. In a number of cases a recent author has been at pains to correct the cardinal points to which museum workers in the East have referred localities in Siam. This is quite unnecessary as the directions as originally given are in accordance with the zoo-geographical divisions described in detail, with a map, in Kloss' well-known paper (Journ. Nat. Hist. Soc. Siam, I, 1915, p. 250).

A HANDLIST OF MALAYSIAN MAMMALS.

Order INSECTIVORA.

Family TUPAIIDÆ.[1]

Genus TUPAIA Raffles, 1821.

Tupaia glis.[2] Common Tree Shrew.

Tupaia glis glis (Diard).

✓ *Sorex glis* Diard, Asiat. Journ. Month. Reg. X, 1820, p. 478: Penang Island.

× *Tupaia ferruginea penangensis* Rob. and Kl., Journ. F. M. S. Mus. IV, 1911, p. 242: Penang.

Distr.—Malay Peninsula (part); Penang Island.

Tupaia glis wilkinsoni Rob. and Kl.

Tupaia ferruginea wilkinsoni Robinson and Kloss, Journ. Fed. Malay States Mus. IV, 1911, p. 173: Ko-khau, Trang, Peninsular Siam.

Distr.—Peninsular Siam (part).

Tupaia glis ferruginea Raffles.

Tupaia ferruginea Raffles, Trans. Linn. Soc. XIII, 1821, p. 256: Singapore Island.

Distr.—Singapore Island and Malay States.

Tupaia glis operosa Rob. and Kl.

Tupaia ferruginea operosa Robinson and Kloss, Ann. Mag. Nat. Hist. (8), XIII, 1914, p. 233: Koh Samui.

Distr.—Koh (Island) Samui, North-East Malay Peninsula.

Tupaia glis ultima Rob. and Kl.

Tupaia ferruginea ultima Robinson and Kloss, Ann. Mag. Nat. Hist. (8), XIII, 1914, p. 234: Koh Pennan.

Distr.—Koh (Island) Pennan, North-East Malay Peninsula.

Tupaia glis longicauda Kl.

Tupaia ferruginea longicauda Kloss, Ann. Mag. Nat. Hist. (8), VII, 1911, p. 117: East Perhentian Island.

Distr.—East and West Perhentian Islands, off Trengganu, east coast Malay Peninsula.

Tupaia glis obscura Kl.

× *Tupaia obscura* Kloss, Ann. Mag. Nat. Hist. (8), VII, 1911, p. 117: Great Redang Island.

Distr.—Great Redang Island, off Trengganu, east coast Malay Peninsula.

Tupaia glis sordida Mill.
Tupaia sordida Miller, Proc. Wash. Acad. Sci. II, 1900, p. 231: Tioman Island.
Distr.—Tioman Island, off Pahang, east coast Malay Peninsula.

Tupaia glis pemangilis Lyon.
Tupaia pemangilis Lyon, Proc. Biol. Soc. Wash. XXIV, 1911, p. 168: Pemanggil Island.
Distr.—Pemanggil Island, off Johore, east coast Malay Peninsula.

Tupaia glis pulonis Mill.
Tupaia pulonis Miller, Smiths. Misc. Coll. XLV, 1903, p. 56: Aor Island.
Distr.—Aor Island, off Johore, east coast Malay Peninsula.

Tupaia glis cognata Chas.[2]
Tupaia glis cognata Chasen, Bull. Raff. Mus. 15, 1940, p. 9: Panjang Island, Peninsular Siam.
Distr.—Islands of Panjang, Panjang North, and Junk Seylon, west coast Peninsular Siam.

Tupaia glis umbratilis Chas.[2]
Tupaia glis umbratilis Chasen, Bull. Raff. Mus. 15, 1940, p. 9: Telibon Island.
Distr.—Telibon Island, Trang, west coast Peninsular Siam.

Tupaia glis raviana Lyon.
Tupaia raviana Lyon, Proc. Biol. Soc. Wash. XXIV, 1911, p. 167: Rawi Island.
Distr.—Islands of Rawi and Adang, Butang Islands, Straits of Malacca.

Tupaia glis lacernata Thos. and Wrought.
Tupaia lacernata Thomas and Wroughton, Ann. Mag. Nat. Hist. (8), IV, 1909, p. 535: Langkawi Island.
Distr.—Islands of Langkawi and Terutau, Straits of Malacca.

Tupaia glis demissa Thos.
Tupaia ferruginea demissa Thomas, Zool. Anz. XXVII, 1904, p. 723: Tanjong Bringin, Lower Langkat, North-East Sumatra.
Tupaia glis phoeniura Thos., Ann. Mag. Nat. Hist. (9), XI, 1923, p. 255: Deli, North-East Sumatra.
Distr.—Sumatra (part).

Tupaia glis jacki Rob and Kl.
Tupaia glis jacki Robinson and Kloss, Journ. Fed. Malay States Mus. VIII, pt. 2, 1918, p. 15: Siolak Daras, Korinchi Valley, West Sumatra.
Distr.—Sumatra (part).

*** Tupaia glis siaca Lyon.**
Tupaia siaca Lyon, Proc. U.S. Nat. Mus. XXXIV, 1908, p. 661: Little Siak River, East Sumatra.
Distr.—Sumatra (part).

TUPAIIDÆ

Tupaia glis castanea Mill.
Tupaia castanea Miller, Smiths. Misc. Coll. XLV, 1903, p. 90: Bintang Island.
Distr.—Bintang Island, Rhio Archipelago.

Tupaia glis batamana Lyon.
Tupaia ferruginea batamana Lyon, Proc. U.S. Nat. Mus. XXXI, 1907, p. 656: Batam Island.
Distr.—Batam Island, Rhio Archipelago.

Tupaia glis redacta Rob.
× *Tupaia castanea redacta* Robinson, Journ. Fed. Malay States Mus. VII, 1916, p. 63: Mapor Island.
Distr.—Mapor Island, Rhio Archipelago.

Tupaia glis phæura Mill.
× *Tupaia phaeura* Miller, Proc. Acad. Sci. Philad. 1902, p. 157: Singkep Island.
Distr.—Singkep Island, Lingga Archipelago.

Tupaia glis discolor Lyon.
× *Tupaia discolor* Lyon, Proc. U.S. Nat. Mus. XXXI, 1906, p. 602: Banka Island.
Distr.—Banka Island.

***Tupaia glis tephrura Mill.**
× *Tupaia tephrura* Miller, Smiths. Misc. Coll. XLV, 1903, p. 57: Tana Bala Island.
Distr.—Tana Bala Island, Batu Islands, West Sumatra.

Tupaia glis chrysogaster Mill.
Tupaia chrysogaster Miller, Smiths. Misc. Coll. XLV, 1903, p. 58: North Pagi Island.
Distr.—North and South Pagi Islands, and Sipora Island, Mentawi Islands, West Sumatra.

Tupaia glis siberu Chas and Kloss.
× *Tupaia glis siberu* Chasen and Kloss, Proc. Zool. Soc. 1927, p. 833: Siberut Island.
Distr.—Siberut Island, Mentawi Islands, West Sumatra.

Tupaia glis natunæ Lyon.
Tupaia natunae Lyon, Proc. Biol. Soc. Wash. XXIV, 1911, p. 168: Bunguran Island.
Distr.—Bunguran Island, North Natuna Islands.

***Tupaia glis lucida Thos. and Hart.**
× *Tupaia splendidula lucida,* Thomas and Hartert, Nov. Zool. II, 1895, p. 490: Laut Island.
Distr.—Laut Island, North Natuna Islands.

Tupaia glis chrysomalla Mill.
Tupaia chrysomalla Miller, Proc. Wash. Acad. Sci. II, 1900, 1900, p. 232: Siantan Island.
Distr.—Siantan Island, Anamba Islands.

× ***Tupaia glis riabus Lyon.**

Tupaia riabus Lyon, Proc. U.S. Nat. Mus. XLV, 1913, p. 88: Riabu Island.

Distr.—Riabu Island, Anamba Islands.

Tupaia glis anambæ Lyon.

Tupaia anambae Lyon, Proc. U.S. Nat. Mus. XLV, 1913, p. 89: Jimaja Island.

Distr.—Jimaja Island, Anamba Islands.

Tupaia glis hypochrysa Thos.

Tupaia ferruginea hypochrysa Thomas, Ann. Mus. Civ. Stor. Nat. Genova, XIV, 1895, p. 6: Java.

Distr.—Java.

Tupaia glis longipes Thos.

Tupaia ferruginea longipes Thomas, Ann. Mag. Nat. Hist. (6), II, 1893, p. 343: Sarawak.

Distr.—Borneo (part).

Tupaia glis salatana Lyon.

Tupaia longipes salatana Lyon, Proc. U.S. Nat. Mus. XLV, 1913, p. 71: Pangkallahan River, South-East Borneo.

Distr.—Borneo (part).

× ***Tupaia splendidula Gray.**

Tupaia splendidula Gray, Proc. Zool. Soc. 1865, p. 322, pl. 12: Borneo, probably the southern part.

Tupaia ruficaudata Mivart, Journ. Anat. Physiol. I, 1867, p. 293: renaming of type of *splendidula*.

Distr.—Borneo.

× ***Tupaia carimatæ Miller.**

Tupaia carimatae Miller, Proc. U.S. Nat. Mus. XXXI, 1906, p. 61: Karimata Island.

Distr.—Karimata Island, West Borneo.

× ***Tupaia mülleri Kohl.** Müller Tree Shrew.

Tupaja Mülleri Kohlbrugge, Natuur. Tijdschr. Ned. Ind. LV, (or 9th ser., deel 4, afl. 2), 1895, p. 196: near Banjermasin, South-East Borneo.

Distr.—Borneo.

Tupaia montana. Mountain Tree Shrew.

Tupaia montana montana Thos.

Tupaia montana Thomas, Ann. Mag. Nat. Hist. (6), IX, 1892, p. 252: Mt. Dulit, Sarawak, 5,000 ft.

Distr.—Borneo (part).

Tupaia montana baluensis Lyon.

Tupaia montana baluensis Lyon, Proc. U.S. Nat. Mus. XLV, 1913, p. 95: Mt. Kinabalu, North Borneo, 3,000 ft.

Distr.—Borneo (part).

Tupaia javanica.[3] Small Tree Shrew.

Tupaia javanica javanica Horsf.

Tupaia javanica Horsfield, Zool. Researches Java (3), 1822; near Banjoewangi, East Java.

Tupaia javanica balina Thos., Ann. Mag. Nat. Hist. (8), XI, 1913, p. 505: Bali.

Distr.—Java (part); Bali.

Tupaia javanica occidentalis Rob. and Kl.

Tupaia javanica occidentalis Robinson and Kloss, Journ. Fed. Malay States Mus. VIII, pt. 2, 1918, p. 16: Sungai Penoh, Korinchi Valley, West Sumatra.

Tupaia javanica bogoriensis Sody, Temminckia, II, 1937, p. 213: Buitenzorg, West Java.

Tupaia javanica tjibruniensis Sody, Temminckia, II, 1937, p. 213: Bandoeng, West Java.

Distr.—Sumatra; Nias Island; Java (part).

Tupaia minor. Günther Tree Shrew.

Tupaia minor minor Günth.

Tupaia minor Günther, Proc. Zool. Soc. 1876, p. 426: Borneo, mainland opposite island of Labuan.

Glipora leucogaster Jent., (MS. Diard), Cat. Syst. Mamm. 1888, XII, p. 116: Borneo (*nom. nud.*).

Distr.—Borneo (part).

Tupaia minor caedis Chas. and Kl.

Tupaia minor caedis Chasen and Kloss, Bull. Raffles Mus. 6, 1931, p. 40: Balambangan Island, North Borneo.

Distr.—Borneo (part); islands of Banguey and Balambangan.

Tupaia minor malaccana And.[4]

Tupaia malaccana Anderson, Zool. Res. Yunnan, 1879, p. 134, pl. 7: Malacca.

Distr.—Malay States; Lingga Island.

*** Tupaia minor sincipis Lyon.**

× *Tupaia sincipis* Lyon, Proc. Biol. Soc. Wash. XXIV, 1911, p. 169; Singkep Island.

Distr.—Singkep Island, Lingga Archipelago.

Tupaia minor humeralis Rob. and Kl.

× *Tupaia minor humeralis* Robinson and Kloss, Journ. Fed. Malay States Mus. VII, 1919, p. 265: Rimbo Pengadeng, Bencoolen, West Sumatra.

Distr.—Sumatra.

Tupaia gracilis. Slender Tree Shrew.

Tupaia gracilis gracilis Thos.

Tupaia gracilis Thomas, Ann. Mag. Nat. Hist. (6), XII, 1893, p. 53: base of Mt. Batu Song, Baram, Sarawak.

Distr.—Borneo; Banguey Island.

Tupaia gracilis inflata Lyon.
Tupaia inflata Lyon, Proc. U.S. Nat. Mus. XXXI, 1906, p. 600: Banka Island.
Distr.—Islands of Banka and Billiton.

Tupaia gracilis edarata Lyon.
Tupaia gracilis edarata Lyon, Proc. U.S. Nat. Mus. XLV, 1913, p. 118: Karimata Island.
Distr.—Karimata Island.

Tupaia picta Thos. Painted Tree Shrew.
Tupaia picta Thomas, Ann. Mag. Nat. Hist. (6), IX, 1892, p. 251: Baram, Sarawak.
Distr.—Borneo.

Tupaia dorsalis Schleg. Striped Tree Shrew.
Tupaja dorsalis Schlegel, Handl. Beoef. Dierk., 1857, p. 59 pl. 3: Lower Kapuas River, West Borneo.
Distr.—Borneo.

Tupaia tana.[5] Large Tree Shrew.

Tupaia tana tana Raff.
Tupaia tana Raffles, Trans. Linn. Soc. XIII, 1821, p. 257: west coast of Sumatra, probably Bencoolen.
Tana tana nainggolani Sody, Natuur. Tijdschr. Ned. Ind. XCVI, 1936, p. 54: Perlak, East Atjeh, North Sumatra.
Distr.—Sumatra (part).

Tupaia tana speciosa (Wagn.).
Cladobates speciosus Wagner, in Schreber, Säugth. Suppl. II, 1840, p. 43: Borneo, *restr.* Banjermasin, South Borneo.
Distr.—Sumatra (part); Borneo (part).

Tupaia tana besara (Lyon).
Tana tana besara Lyon, Proc. U.S. Nat. Mus. XLV, 1913, p. 141: opposite Pulau Jambu, below Tyan, Kapuas River, West Borneo.
Distr.—Borneo (part).

Tupaia tana nitida Chas.
Tupaia tana nitida Chasen, Bull. Raffles Mus. 8, 1933, p. 197: Mt. Poi, West Sarawak.
Distr.—Borneo (part).

Tupaia tana utara (Lyon).
Tana tana utara Lyon, Proc. U.S. Nat. Mus. XLV, 1913, p. 141: Mt. Dulit, Sarawak, 3,000 ft.
Distr.—Borneo (part).

Tupaia tana chrysura Günth.
Tupaia tana var. *chrysura* Günther, Proc. Zool. Soc. 1876, p. 427, pl. 36: Borneo, opposite Labuan Island.
Tana tana griswoldi Coolidge, Proc. New Engl. Zool. Club, XVII, 1938, p. 45: Kiau, British North Borneo, 3,300 ft.
Distr.—Borneo (part).

Tupaia tana paitana (Lyon).
× *Tana paitana* Lyon, Proc. U.S. Nat. Mus. XLV, 1913, p. 150: Paitan River, North-East Borneo.
Distr.—Borneo (part).

Tupaia tana banguei Chas. and Kl.
Tupaia tana banguei Chasen and Kloss, Bull. Raffles Mus. 6, 1931, p. 44: Banguey Island.
Distr.—Banguey Island, North Borneo.

***Tupaia tana cervicalis Mill.**
× *Tupaia cervicalis* Miller, Smiths. Misc. Coll. XLV, 1903, p. 59: Tana Bala Island.
Distr.—Tana Bala Island, Batu Islands, West Sumatra.

***Tupaia tana masæ (Lyon).**
× *Tana cervicalis masae* Lyon, Proc. U.S. Nat. Mus. XLV, 1913, p. 148: Tana Masa Island.
Distr.—Tana Masa Island, Batu Islands, West Sumatra.

***Tupaia tana tuancus (Lyon).**
× *Tana tana tuancus* Lyon, Proc. U.S. Nat. Mus. XLV, 1913, p. 145: Tuangku Island.
Distr.—Tuangku Island, Banjak Islands, West Sumatra.

***Tupaia tana lingæ (Lyon).**
× *Tana lingae* Lyon, Proc. U.S. Nat. Mus. XLV, 1913, p. 145: Lingga Island.
Distr.—Lingga Island, Lingga Archipelago.

Tupaia tana sirhassenensis Mill.
Tupaia sirhassenensis Miller, Proc. Wash. Acad. Sci. III, 1901, p. 133: Sirhassen Island.
Distr.—Sirhassen Island, South Natuna Islands.

***Tupaia tana bunoæ Mill.**
× *Tupaia bunoae* Miller, Proc. Wash. Acad. Sci. II, 1900, p. 229: Bunoa Island.
Distr.—Big Tambelan and Bunoa Island, Tambelan Islands, South China Sea.

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1 *Tupaiidae:* Revisions: Lyon, Proc. U. S. Nat. Mus. XLV, 1913, pp. 1–188: Cabrera, Gen. Mamm. 1925, pp. 11–25.

Errata.—For *upper molar row* read *maxillary tooth row* in Proc. Zool. Soc. 1928, p. 834 and Bull. Raff. Mus. 6, 1931, pp. 73–76 (but not on pp. 77–78).

2 *Tupaia glis.* Lyon arranges all the members known to him in the long list of forms here treated as subspecies of *glis* into sixteen species, only three of which have subspecies, but I can find no reason for keeping them apart. Even the subspecies most remote from each other in colour can be linked by intermediate forms and any grouping on general facies is at variance with a geographical arrangement. In no place have

two distinct forms been shown to occur together and I am by no means certain that *splendidula* and *carimatae* are rightly excluded from the ubiquitous *glis*. I have not seen *splendidula*, but as it is recorded from South Borneo from the precise localities wherein *longipes* has been collected I must keep it separate for the present: and, until the status of *splendidula* is confirmed, that of *carimatae* must also remain in abeyance. It seems likely that *splendidula* is a phase of *longipes*. For a note on the Bornean races of *glis* see Chas., Bull. Raff. Mus. 8, 1933, p. 197.

T. demissa and *phoeniura* I believe to be phases of the same subspecies: I have seen whitish tails from near the type locality of *phoeniura*.

Since any author dealt with the forms of *glis* occurring in the Malay Peninsula much additional material has accumulated in Singapore, but as is often the case the larger collections confound rather than simplify our notions of the subspecies and it was much easier to define and arrange the local races on the limited material available twenty-five years ago than at present!

In some cases the differences between the various forms are easier to appreciate when the animals are in worn dress than in fresh pelage. For instance, specimens from Penang (*glis*) and Singapore (*ferruginea*) are often almost, if not quite, indistinguishable in colour in fresh pelage, but the more southern form "burns" to a deeper red and in series the two forms look quite different. There is much that I cannot understand about the pelage changes and distribution of the Malayan subspecies, but the broad facts are as follows:—

Typical *ferruginea* occurs in the south of the Peninsula, but in the north of the Malay States grades into a slightly less bright form which differs from that of Penang Island only on account of its very slightly longer skull (total length, 49–53·2 against 48·5–51·5 mm.). This slightly duller form occurs on the mainland opposite Penang, in Kedah, Perlis and Patani. Such animals are also found along the *east* coast of Peninsular Siam as far north as Kao Nawng and Ban Kop Klap in Bandon. They form a link between *wilkinsoni* of Trang and *ferruginea*. On the west coast of Peninsular Siam *wilkinsoni* not only intergrades with *glis* but appears also to inosculate with that form for I have a manuscript note by Kloss recording that he has seen very typical examples of *wilkinsoni* from as far south as Kedah Peak.

At Koh Lak and Hat Sanuk in South-West Siam there is a form with little or no ochraceous on the lower back: presumably it is *T. g. tenaster*. A series from a number of localities about the Isthmus of Kra and the Pakchan Estuary is, by direct comparison with topotypes, referred to *clarissa*, which therefore just enters the Malaysian area. I place a specimen from Koh Rah on the Takuapa Estuary with this form which is brighter on the lower back than *tenaster*. The more richly coloured *wilkinsoni* which has only two pairs of mammae, is represented by specimens from various localities along the west side of the Peninsula south of the range of *clarissa* and south to Chong in Trang, but even within this limited area a series from Ghirbi shows up rather duller than some from further south. The difference is, perhaps, seasonal. Its representatives on the islands off the west coast of Siam are worth recognition as separate subspecies.—

Tupaia glis cognata subsp. nov.

In colour nearest to *T. g. clarissa* of North Peninsular Siam; paler, and markedly colder in tone on the anterior part of the body than in *wilkinsoni;* and with a smaller skull than either of these forms: mammæ, three pairs. The total length of adult skulls is 48–51·9 against 50·8–53·6 mm. in the mainland forms. No comparison with *raviana* and *lacernata* is necessary.

Type.—Adult male, skin and skull, collected on Panjang Island, Junk Seylon group, west coast Peninsular Siam, on 24th January, 1918, by a native collector. Raffles Museum No. 4332.

External measurements (taken in the flesh).—Head and body, 168; tail, 148, hind-foot (s.u.) 40; ear, 16 mm.

Skull.—Greatest length, 50·5; condylo—basal length, 47·5; greatest breadth, 25; maxillary tooth-row (alveoli), 18·5; lachrymal notch to tip of premaxilla, 22·4 mm.

Specimens examined.—Seventeen from Panjang Island; two from the neighbouring islet of Panjang North; four from Junk Seylon; and eleven from Lontar Island, all off the west coast of Peninsular Siam.

Tupaia glis umbratilis subsp. nov.

Like *T. g. cognata*, but the under parts darker, less buffy and more brown.

Size about as in *cognata;* adults have the greatest length of the skull, 48·5–50·1 mm.

Type.—Adult male, skin and skull, collected on Telibon Island, west coast of Trang, Peninsular Siam, on 31st December, 1916, by H. C. Robinson. F.M.S. Mus. No. 143/17.

External measurements (taken in the flesh).—Head and body, 172; tail, 144; hind-foot, (s.u.) 40; ear, 16 mm.

Skull.—Greatest length, 49·5, condylo-basal length 46; greatest breadth, 24·5; maxillary tooth row (alveoli), 17·8; lachrymal notch to tip of premaxilla, 21·4 mm.

Specimens examined.—Ten, all from the type locality.

Remarks.—In *cognata* and other tupaia races in which the under parts are buffy, the hairs on the throat and middle line are uniformly pale in colour, or nearly so, from base to tip, but in *umbratilis* the fur is everywhere dark, from grey to almost black at the base, with small buff tips. The general effect is of a rather coarse grizzle of dull brown and buff and even the insides of the thighs are thus darkly coloured. Such darkened under parts are also common in *lacernata* of Langkawi Island, but *umbratilis* lacks the dark tail of that form and is quite different on the upper parts. The Butang Island race *raviana* has no distinct ochraceous wash on the posterior part of the back.

3 *Tupaia javanica.* Forty skins from various parts of Java include some exact topotypes of *javanica* to which race two specimens from Karangbolong on the north coast of Mid-Java appear to belong. Specimens from various parts of West Java seem to be absolutely inseparable from the South Sumatran *occidentalis* which, as far as I can see, in colour differs only from *javanica* by reason of its slightly darker, more ochraceous under parts.

4 *Tupaia minor.* Although common in the Malay States from Upper Perak south to Johore this species has not been recorded from Peninsular Siam, but two immature examples in the Raffles Museum are from Kok Lak, South-West Siam. I rather doubt if these latter specimens should be properly referred to the typical race.

5 *Tupaia tana.* This is the genotype of *Tana* Lyon; but the generic separation of *Tana* from *Tupaia* is not here accepted (see Chas. and Kl., Bull. Raff. Mus. 6, 1931, p. 43).

T. t. griswoldi Coolidge, was based on a single immature animal with the back molars not properly up. It has yet to be shown that the form of *tana* found in the lowlands of the west coast of British North Borneo differs from *chrysura* in which the yellowish tail is almost certainly not permanent.

Genus **DENDROGALE** J. E. Gray, 1848.[1]

Dendrogale melanura. Smooth-tailed Tree Shrew.

Dendrogale melanura melanura (Thos.).

✓ *Tupaia melanura* Thomas, Ann. Mag. Nat. Hist. (6), IX, 1892, p. 251: Mt. Dulit, North Sarawak, 5,000 ft.

Distr.—Borneo (part).

Dendrogale melanura baluensis Lyon.

Dendrogale melanura baluensis Lyon, Proc. U.S. Nat. Mus. XLV, 1913, p. 132: Mt. Kinabalu, North Borneo.

Distr.—Borneo (part).

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[1] *Dendrogale murina* Schleg. and Müller, in Temm., Verh. nat. gesch. Ned. overz. bezitt., Zool. 1839, p. 167, said to have come from Pontianak, West Borneo, seems a very doubtful species. It has never again turned up in Borneo and the type is so very like the Indo-Chinese *frenata* that I have dropped the name from the Malaysian list.

Genus PTILOCERCUS J. E. Gray, 1848.[1]

Ptilocercus lowii. Pen-tailed Shrew.

Ptilocercus lowii lowii Gray.

Ptilocercus Lowii Gray, Proc. Zool. Soc. 1848, p. 23: Kuching, Sarawak.

Distr.—Borneo; Labuan Island; Sirhassen Island, South Natuna Islands.

Ptilocercus lowii continentis Thos.

Ptilocercus lowii continentis Thomas, Ann. Mag. Nat. Hist. (8), V, 1910, p. 426; near Kuala Lumpur, Selangor.

Distr.—Malay States; Sumatra; Banka; Karimon Island, Rhio Archipelago; Pinie Island, Batu Islands, West Sumatra.

Family ERINACEIDÆ.

Genus ECHINO-SOREX Blainville, 1838.

Echino-Sorex gymnurus.[2] Moonrat.

Echino-Sorex gymnurus gymnurus (Raffles).

✓ *Viverra gymnura* Raffles, Trans. Linn. Soc. XIII, 1821, p. 273: Bencoolen, West Sumatra.

✓ *Gymnura rafflesii* Less., Man. Mamm. 1827, p. 171: Sumatra.

Distr.—Sumatra; Malay Peninsula (part).

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[1] *Ptilocercus.* Shelford ("A Naturalist in Borneo", London, 1916) mentions species from "Bali", but I think this must be a *lapsus* for "Banka."

[2] *Echino-Sorex* (better known as *Gymnura*). Revisions: Lyon, Proc. U. S. Nat. Mus. XXXVI, 1909, p. 449; Cabrera, Gen. Mamm. 1925, p. 58; and Chasen, Bull. Raffles Mus. 4, 1934, p. 86.

Most specimens from Sarawak are white but pied animals like Sumatran and Malayan specimens also occur.For the moment these are regarded as extreme examples of the darker of the two Bornean races, *candidus*, but it is possible that a third race, not mainly white, exists in the extreme north-west corner of the island.

I am a little doubtful about the occurrence of *birmanicus* in the Peninsula. Topotypes of *gymnurus* from Sumatra have the basal length of the skull, 70–78 mm. with, judging by the few specimens known, a rather low average in the north of the island. Taking all the Malay States (including Patani) together we get a basal length of 70–82 mm. From Trang in Peninsular Siam, four specimens give 67–71 mm. for the basal length, but the minimum may represent specimens not fully grown.

Gymnura borneotica Fitz., Sitz. Ak. Wiss. Wien, 1868, p. 133 (Borneo) is perhaps best regarded as a synonym of *albus.*

Echino-Sorex gymnurus birmanicus Trouess.
Gymnura birmanica Trouessart, Rev. Mag. Zool. 1879, p. 240: Bankachon, South Tenasserim.
Gymnura gymnura minor Lyon, Proc. U. S. Nat. Mus. XXXVI, 1909, p. 453: Trang, Peninsular Siam.
Distr.—Peninsular Siam (part).

X **Echino-Sorex gymnurus albus (Gieb.).**
Gymnura alba Giebel, Zeitschr. Ges. Nat., XXII, 1863, p. 277, pls. 1 and 2: Banjermasin, South Borneo.
Distr.—Borneo (part).

X **Echino-Sorex gymnurus candidus (Günth.).**
Gymnura rafflesii var. *candida* Günther, Proc. Zool. Soc. 1876, p. 425: Labuan.
Distr.—Borneo (part).

Genus HYLOMYS Müller, 1839.

Hylomys suillus. Short-tailed Shrew.

✓ **Hylomys suillus suillus Müll.**
Hylomys suillus Müller in Temminck, Verh. nat. gesch. Ned. overz. bezitt., Zool. 1839, pp. 25, 50; Java.
Distr.—Java.

✓ **Hylomys suillus maxi Sody.**
Hylomus suillus maxi Sody, Ann. Mag. Nat. Hist. (10), XII, 1933, p. 438: Giesting, Lampongs, South Sumatra.
Distr.—Malay States; Sumatra (part).

Hylomys suillus parvus Rob. and Kl.
Hylomys parvus Robinson and Kloss, Journ. Strs. Br. Roy. Asiat. Soc. No. 73, 1916, p. 269: Korinchi Peak, Sumatra, 10,000 ft.
Distr.—Sumatra (part).

✓ **Hylomys suillus dorsalis Thos.**
Hylomys suillus dorsalis Thomas, Ann. Mag. Nat. Hist. (6), II, 1888, p. 407: Mt. Kinabalu, North Borneo.
Distr.—Borneo.

✓ **Hylomys suillus tionis Chas.**[1]
Hylomys suillus tionis Chasen, Bull. Raffles Mus. 15, 1940, p. 12: Tioman Island.
Distr.—Tioman Island, off Pahang, east coast Malay Peninsula.

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[1] **Hylomys suillus tionis** subsp. nov.

Paler on the upper parts than the typical race from Java and nearest to the Sumatran-Malay subspecies *maxi*, but very slightly more richly coloured, the difference being especially noticeable on the posterior half of the back, and on the outside of the thighs. Prevailing colour of underparts buffy, not grey.

Skull very slightly longer than in the available specimens and records of *maxi*.

Type.—Adult male, skin and skull, collected on Tioman Island, east coast of Pahang, Malay Peninsula, on 21st July, 1916, by C. Boden Kloss. Raffles Museum No. 4333.

External measurements (taken in the flesh).—Head and body, 146, (131), tail, 17 (17); hind-foot (s.u.), 27 (26); ear, 16·5 (16) mm.

Skull.—Greatest length, 37·9; basal length, 34·7; palatal length, 20·8; upper tooth row, 18·8; zygomatic breadth, 20·5 mm. The figures in brackets are of a female collected on Tioman by H. C. Robinson in 1915. The skull is so badly smashed that it provides no comparable measurements.

Remarks.—*Hylomys* is a rare genus in the Malay States. Its occurence on the small island of Tioman is remarkable as it has hitherto only been recorded from the large land masses. In the Peninsula *maxi* ranges as far north as Perlis, but there is no record from Peninsular Siam proper. The quite distinct northern form *H. s. siamensis* is found as far south as the Isthmus of Kra whence I have it from Tapli, just above the Pakchan Estuary and only a few miles north of the Malaysian boundary.

Family TALPIDÆ.[1]

Genus TALPA Linn., 1758.

Talpa klossi. Mole.

[**Talpa klossi klossi** Thos.
Talpa klossi Thomas, Ann. Mag. Nat. Hist. (10) III, 1929, p. 206: Hue Nya Pla, near Raheng, West Siam.
Distr.—Extralimital.]

Talpa klossi malayana Chas.[2]
Talpa klossi malayana Bull. Raffles Mus. 15, 1940 p. 13: the Cameron Highlands, Pahang, Malay States, 5,000 ft.
Distr.—Malay States.

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[1] *Talpidae*. Revision: Cabrera, Gen. Mamm. 1925, p. 85.

[2] **Talpa klossi malayana** subsp. nov.

Like *T. k. klossi*, but darker in colour.

Type.—Adult male, skin and skull, collected at the Kuala Terla Tea Estates, Cameron Highlands, Pahang, Malay States, 5,000–5,500 ft. by a Dyak collector, on 29th August, 1937. Raffles Museum No. 4334.

External measurements (*taken in the flesh*).—Head and body, 130, 132 (138); tail, 6,7 (11); hind-foot s.u., 14, 14·5 (16); breadth of front foot, 14, 15 mm.

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Skull.—Greatest length, 31·5, 32 (32); basal length, 26·9, 27·3 (26); interorbital breadth, 7·2, 7·3 (6·5); greatest breadth, 15, 15·1 (15); height of muzzle from base of p^2, 3·1, 2·7 (3); breadth of muzzle at same point, 4·3, 4·6 (4·2); front of p^4 to back of m^3, 7, 7·3 (7·5); tip of canine to tip of p^4, 4, 4·1 mm.

The measurements given first are those of the type; second, those of a female from the type locality; in brackets, those of the type of *klossi*.

Remarks.—Until Mr. M. W. F. Tweedie recognised traces of moles in the tea estates of the Cameron Highlands in the Pahang Mountains in 1937, the presence of moles was unsuspected in the Malay Peninsula, and but for the clearing of the heavy primary forest for agricultural purposes in a newly opened area, would probably have remained so for many years. The discovery is of interest both as an addition to the Malaysian fauna and also as a remarkable extension to the known range of the genus *Talpa*, which was hitherto known only from as far south as West Siam and Hainan Island. Its discovery south of the Isthmus of Kra is totally unexpected, and from the point of view of zoogeography of considerable importance.

The two specimens recently obtained are very like *klossi* in all the essential characters of size, proportions, skull and details of dentition, but Mr. R. W. Hayman who has kindly made a direct comparison at the British Museum (Nat. Hist.) of *malayana* and the type of *klossi* informs me that the Malayan skin is darker and blacker. Placed side by side *malayana* shows up as a dark iron-grey against the paler brownish colour of the more northern form. This difference is confirmed in Singapore by a second specimen of *klossi* from North Siam.

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Family SORICIDÆ.[1]

Genus CROCIDURA Wagler, 1832.[2]

Crocidura orientalis. White-toothed Shrews.

Crocidura orientalis orientalis Jent.
Crocidura orientalis Jentink, in Weber's Zool. Ergeb. Reis. Ned. Ost. Ind. I, 1890, p. 124: Tjibodas, West Java.
Distr.—Java (part).

X * **Crocidura orientalis lawuana Sody.**
Crocidura orientalis lawuana Sody, Natuurk. Tijds. Ned. Ind. XCVI, 1936, p. 52: Mt. Lawu, East Java. 2000 m.
Distr.—Java (part).

Crocidura baluensis Thos.
Crocidura (Croc.) baluensis Thomas, Ann. Mag. Nat. Hist. (7), II, 1898, p. 247: Mt. Kinabalu, North Borneo.
Distr.—Borneo.

* **Crocidura villosa Rob. and Kl.**
Crocidura villosa Robinson and Kloss, Journ. Fed. Malay States Mus. VIII, pt. 2, 1918, p. 21: Sungai Kumbang, Korinchi, West Sumatra. 4,700 ft.
Distr.—Sumatra.

Crocidura æquicauda Rob. and Kl.
Crocidura aequicauda Robinson and Kloss, Journ. Fed. Malay States Mus. VIII, pt. 2, 1918, p. 22: Sungai Kring, Korinchi Peak, West Sumatra, 7,200 ft.
Distr.—Sumatra; Malay Peninsula.

* **Crocidura paradoxura Dobs.**
Crocidura paradoxura Dobson, Ann. Mus. Civ. Stor. Nat. Genova, IV, 1886, p. 566: Mt. Singalang, Sumatra, 2,000 m.
Distr.—Sumatra.

* **Crocidura neglecta Jent.**
Crocidura neglecta Jentink, Notes Leyd. Mus. X, 1888, p. 165, Sumatra.
Distr.—Sumatra.

* **Crocidura brevicauda Jent.**
Crocidura brevicauda Jentink, in Weber's Zool. Ergeb. Reis. Ned. Ost. Ind. I, 1890, p. 124: Tjibodas near Sindanglaja, Java.
Distr.—Java.

* **Crocidura bartelsii Jent.**
Crocidura Bartelsii Jentink, Notes Leyd. Mus. XXXII, 1910, p. 197: Mt. Pangerango.
Distr.—Java.

* **Crocidura monticola Peters.**
Crocidura monticola Peters, Mon. Ber. Akad. Berl. 1870, p. 584: Mt. Lawu, near Surakarta, Java, 3,500 ft.
Distr.—Java; Borneo.

Crocidura brunnea.

Crocidura brunnea brunnea Jent.
Crocidura brunnea Jentink, Notes Leyd. Mus. X, 1888, p. 164; Java.
Distr.—Java (part); Sumatra.

Crocidura brunnea pudjonica Sody.
Crocidura brunnea pudjonica Sody, Natuur. Tijdschr. Ned. Ind. XCVI, 1936, p. 52: Poedjon, East Java.
Distr.—Java (part).

* **Crocidura doriæ Peters.**
Crocidura doriae Peters, Mon. Ber. Akad. Berl. 1870, p. 584: Sarawak.
Distr.—Borneo.

SORICIDÆ

* **Crocidura fœtida Peters.**
Crocidura foetida Peters, Mon. Ber. Akad. Berl. 1870, p. 584: Borneo.
Distr.—Borneo.

* **Crocidura weberi Jent.**
Crocidura weberi Jentink, in Weber's Zool. Ergeb. Reis. Ned. Ost. Ind. I, 1890, p. 124: Singkarah, Sumatra.
Distr.—Sumatra.

* **Crocidura lepidura Lyon.**
Crocidura lepidura Lyon, Proc. U.S. Nat. Mus. XXXIV, 1908, p. 662: Kateman River, East Sumatra.
Distr.—Sumatra.

* **Crocidura vosmæri Jent.**
Crocidura ? vosmaeri Jentink, Notes Leyd. Mus. X, 1888, p. 165: Banka.
Distr.—Banka Island.

Crocidura malayana Rob. and Kl.
Crocidura malayana Robinson and Kloss, Journ. Fed. Malay States Mus. IV, 1911, p. 243: Maxwell's Hill, Perak, 3,300 ft.
Distr.—Malay States.

Crocidura aagaardi Kl.
Crocidura aagaardi Kloss, Journ. Nat. Hist. Soc. Siam, II, 1917, p. 283: Bang Nara, Patani, Peninsular Siam.
Distr.—Malay Peninsula; Sirhassen, South Natuna Islands.

Crocidura gravida Kl.
Crocidura gravida Kloss, Journ. Fed. Malay States Mus. VII, 1917, p. 127: Dayang Bunting.
Distr.—Dayang Bunting Island, Langkawi group, Straits of Malacca.

Crocidura negligens Rob. and Kl.
Crocidura negligens Robinson and Kloss, Ann. Mag. Nat. Hist. (8), XIII, 1914, p. 232: Koh Samui.
Distr.—Koh (Island) Samui, North-East Malay Peninsula.

Crocidura klossii Rob.
Crocidura klossii Robinson, Ann. Mag. Nat. Hist. (8), X, 1912, p. 589: *nom. nov.* for *C. major* Kl. *infra*.
Crocidura major Kloss, Ann. Mag. Nat. Hist. (8), VII, 1911, p. 117: Gt. Redang Island (not *C. major* Wagl.).
Distr.—Great Redang Island, off Trengganu, east coast Malay Peninsula.

Crocidura tionis Kl.
Crocidura tionis Kloss, Journ. Fed. Malay States Mus. VII, 1917, p. 127: Tioman Island.
Distr.—Tioman Island, off Pahang, east coast Malay Peninsula.

SORICIDÆ

Crocidura aoris Rob.
Crocidura aoris Robinson, Ann. Mag. Nat. Hist. (8), X, 1912, p. 589, Aor Island.
Distr.—Aor Island, off Johore, east coast Malay Peninsula.

Crocidura maporensis Rob. and Kl.
Crocidura maporensis Robinson and Kloss, Journ. Fed. Malay States Mus. VII, 1916, p. 63: Mapor Island.
Distr.—Mapor Island, Rhio Archipelago.

***Crocidura melanorhyncha** Jent.
Crocidura melanorhyncha Jentink, Notes Leyd. Mus. XXXII, 1910, p. 198: Mt. Pangerango, Java, 3,000 ft.
Distr.—Java.

Crocidura beccarii Dobs.
Crocidura beccarii Dobson, Ann. Mus. Civ. Gen. (2), IV, 1886, p. 556: Mt. Singalang, Sumatra.
Distr.—Sumatra.

***Crocidura maxi** Sody.
Crocidura maxi Sody, Natuur. Tijdschr. Ned. Ind. XCVI, 1936, p. 53: East Besoeki, East Java.
Distr.—Java.

***Crocidura minuta** Otten.
Crocidura minuta Otten, Med. Burgerl. Geneesk. Dienst. Ned. Ind. VI, 1917, p. 103: East Java.
Distr.—Java.

Crocidura trichura Dobs.
Crocidura fuliginosa trichura Dobson, Proc. Zool. Soc. 1888, p. 532: Christmas Island.
Distr.—Christmas Island, Indian Ocean.

Crocidura fuliginosa (Blyth).
Sorex fuliginosus Blyth, Journ. Asiat. Soc. Beng. XXIV, 1855, p. 362: Pegu.
Distr.—Malay States; Borneo.

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[1] *Soricidae.* Revisions: Cabr., Gen. Mamm. 1925, p. 103; Koller, Treubia, XI, 1930, p. 313.

[2] *Crocidura.* In the present incomplete state of our knowledge and collections there seems no other course but to accept all the described Malaysian forms of this genus. Almost every specimen that turns up from the small islands near the Malayan coasts seems different from others found previously, but how much of this is due to individual variation we cannot yet say. Published measurements of feet are so uneven that they most obviously should not have been used for comparison, and I am not certain that the tail length, both actual and relative, is such an important diagnostic character as has been supposed.

Furthermore, the relative proportions of tail and body alter with age. Young animals are darker than adults.

The forms *orientalis* (J.) and *baluensis* (B.) seem very closely allied; and *villosus* (S.) which I have not seen, was suggested as the Sumatran representative of this group in the original description.

C. aequicauda (S., M.P.) with the tail about equal to the head and body, and *C. paradoxura* (S.) in which the tail is exceptionally long seem to represent two other species.

C. neglecta (S.) and *C. brevicauda* (J.) are largish forms with *very* short tails.

C. bartelsii (J.) is characterized by very small size, and *C. monticola* (J.S.) is a slightly larger form that also seems to be well-founded.

There remain many forms of whose status and affinites I am in doubt. In the Malay Peninsula there seem to be at least two distinct species in the lowlands. By direct comparison with one of the original series we can accept a brown form as *fuliginosa*. A darker form has been named *malayana*. High level specimens have rather longer fur and may represent another form. *Aagaardi* is very close to *malayana*. *Malayana* seems very intimately connected with *brunnea* (J.) and *weberi* (S.), and although very variable, the numerous forms described from the small coastal islands of the Malay Peninsula are perhaps only subspecies of *malayana*.

The remaining small Malaysian forms probably also stand in subspecific relationship to this *brunnea—malayana* association, or to *fuliginosa*.

For the status of *minuta* see Sody, Natuur. Tijds. Ned. Ind. XC, 1930, p. 263.

Genus SUNCUS Ehrenberg, 1832.

Suncus murinus.[1] Musk Shrew.

Suncus murinus murinus (Linn.).

✓ *Sorex murinus* Linn., Syst. Nat. ed. 12, 1766, p. 74: Java.

✓ *Crocidura sumatranus* Peters, Mon. Ber. Akad. Berl. 1870; p. 593: Palembang, Sumatra.

Crocidura fuscipes Peters, Mon. Ber. Akad. Berl., 1870, p. 594: Singapore Island.

✓ *Pachyura Kroonii* Kohl., Natuur. Tijdschr. Nederl. Ind. iv, 1895, p. 197: Pleihari, South-East Borneo.

Distr.—Malay Peninsula; Anamba Islands; Sumatra; Borneo; Java; Bali.

× **Suncus malayanus (Kl.).** Pigmy Shrew.

Pachyura malayana Kloss, Journ. Nat. Hist. Soc. Siam, II, 1917, p. 282: Bang Nara, Patani, Peninsular Siam.

Distr.—Peninsular Siam; Malay States (Pahang).

Suncus hosei Thos. Pigmy Shrew.

Crocidura (Pachyura) Hosei Thomas, Ann. Mag. Nat. Hist. (6), XI, 1893, p. 343: Bakong River, Baram, East Sarawak.

Distr.—Borneo.

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[1] *Suncus.* The name *murinus* has been used for the common house-shrew of Malaysia for many years and the original description is apt. Furthermore, Linnaeus is not likely to have known any of the indigenous wild Javan forms, the earliest name for any one of which dates from 1870 only.

With *murinus* the Indian animal regarded by Lindsay (Journ. Bomb. Nat. Hist. Soc. 1929, p. 329) as *S. c. caeruleus* seems identical.

An attempt has recently been made to arrange the Malaysian forms of *Suncus* in a manner parallel to that of the house rats and Koller (Treubia, XI, 1930, p. 313) has postulated a wild form ("*S. indicus indicus*") with a commensal form ("*S. indicus caeruleus*"). Over and above the fact that neither of these names can with certainty be applied to Java, I cannot find any justification for the division, and nowhere in Malaysia do I know of the musk shrew other than as an inhabitant of houses, villages and their environs. For its progenitors it seems necessary to look further afield (cf. Sody, Med. Dienst. Volksgezond. Ned. Ind., 1932, p. 39).

Furthermore, the use of extralimital specific names for so-called varieties occurring in Java cannot in all cases be justified for *hosei* and *malayanus* are tiny species very distinct from *murinus*.

Genus **CHIMARROGALE** Anderson, 1877.

Chimarrogale phæura.[1] Water Shrew.

✓**Chimarrogale phæura phæura** Thos.

Chimarrogale phaeura Thomas, Ann. Mag. Nat. Hist. (7), II, 1898, p. 246: Mt. Kinabalu, North Borneo.

Distr.—Borneo.

Chimarrogale phæura sumatrana (Thos.).

✓*Crossogale sumatrana* Thomas, Ann. Mag. Nat. Hist. (9), VII, 1921, p. 244: Padang Highlands, Sumatra.

Distr.—Sumatra.

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[1] Genotype of *Crossogale* Thos. 1921. Revision: Cabrera, Gen. Mamm. 1925, p. 163.

Family GALEOPTERIDÆ.

Genus **GALEOPTERUS** Thomas, 1908.[1]

Galeopterus variegatus. Flying Lemur.

Galeopterus variegatus variegatus (Audt.).
✓ *Galeopithecus variegatus* Audebert, H. N. Singes, 1799, Sign. Rr.: Java.
? *Galeopithecus undatus*, Wagn., in Schreber, Saeugth., Suppl. I, 1839, p. 326: ? Java.
Distr.—Java.

Galeopterus variegatus temminckii (Waterh.).
Galeopithecus temminckii Waterhouse, Proc. Zool. Soc. 1838, p. 119: Sumatra (*Thos. 1908*).
Distr.—Sumatra; Banka (*?subsp.*).

≻ * **Galeopterus variegatus tuancus** (Mill.)
Galeopithecus tuancus Miller, Smiths. Misc. Coll. XLV, 1903, p. 53: Tuangku Island.
Distr.—Tuangku Island, Banjak Islands, West Sumatra.

≻ * **Galeopterus variegatus saturatus** (Mill.).
Galeopithecus saturatus Miller, Smiths. Misc. Coll. XLV, 1903, p. 51: Tana Bala Island.
Distr.—Island of Tana Bala and Pinie, Batu Islands.

≻ * **Galeopterus variegatus tellonis** (Lyon).
✓ *Cynocephalus tellonis* Lyon, Ann. Mag. Nat. Hist. (8), I, 1908, p. 139: Tello Island.
Distr.—Tello Island, Batu Islands, West Sumatra.

Galeopterus variegatus peninsulæ Thos.
Galeopterus peninsulae Thomas, Ann. Mag. Nat. Hist. (8), 2, 1909, p. 303: Semangko Pass, Malay States.
Distr.—Malay Peninsula.

Galeopterus variegatus pumilus (Mill.).
Galeopithecus pumilus Miller, Smiths. Misc. Coll. XLV, 1903, p. 46: Adang Island.
Distr.—Adang Island, Butang Archipelago, Straits of Malacca.

Galeopterus variegatus terutaus Chas. and Kl.
Galeopterus variegatus terutaus Chasen and Kloss, Bull. Raffles Mus. 2, 1929, p. 11: Terutau Island.
Distr.—Terutau and Langkawi Islands, Straits of Malacca.

Galeopterus variegatus perhentianus Chas. and Kl.
Galeopterus variegatus perhentianus Chasen and Kloss, Bull. Raffles Mus. 2, 1929, p. 11: East Perhentian Island.
Distr.—East Perhentian Island, off Trengganu, east coast Malay Peninsula.

Galeopterus variegatus taylori Thos.
Galeopterus taylori Thomas, Journ. Fed. Malay States Mus. II, 1909, p. 102: Tioman Island.
Distr.—Tioman Island, off Pahang, east coast Malay Peninsula.

Galeopterus variegatus aoris (Mill.).

Galeopithecus aoris Miller, Smiths. Misc. Coll. XLV, 1903, p. 47: Aor Island.

Distr.—Aor Island, off Johore, east coast Malay Peninsula.

Galeopterus variegatus chombolis Lyon.

Galeopterus chombolis Lyon, Proc. U.S. Nat. Mus. XXXVI, 1909, p. 486: Chombol Island.

Distr.—Islands of the Rhio-Lingga Archipelagos (Bintang, Batam, Karimon, Kundur, Durian, Sugi, Chombol, Galang, Sebang, Bakong and Penuba).

Galeopterus variegatus natunæ (Mill.).

Galeopithecus natunae Miller, Smiths. Misc. Coll, XLV, 1903, p. 50: Bunguran Island.

Galeopterus borneanus Lyon, Proc. U. S. Nat. Mus. XL, 1911, p. 124: Chantung, near Klumpang Bay, South-East Borneo.

Galeopterus lechei Gyld., Kungl. Sv. Vet. Akad. Handl. LX, No. 6, 1920, p. 17, Toembang Maroewe, Central-East Borneo.

Galeopterus hantu Cabrer., Bol. Real. Soc. Espan. XXIV, 1924, p. 128: North Sarawak.

Distr.—Siantan, Anamba Islands; Bunguran, North Natuna Islands; Borneo; Banguey Island.

Galeopterus variegatus gracilis (Mill.).

× *Galeopithecus gracilis* Miller, Smiths. Misc. Coll. XLV, 1903, p. 49: Sirhassen Island.

Distr.—Islands of Sirhassen and Subi, South Natuna Islands.

Galeopterus variegatus abbotti Lyon.

× *Galeopterus abbotti* Lyon, Proc. U.S. Nat. Mus. XL, 1909, p. 126: Panebangan Island.

Distr.—Panebangan Island, West Borneo; ? Karimata Island (*subsp. incert.*).

Galeopterus variegatus lautensis Lyon.

× *Galeopterus lautenis* Lyon, Proc. U.S. Nat. Mus. XL, 1909, p. 125: Laut Island.

Distr.—Islands of Laut and Sebuko, South-East Borneo.

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1 *Galeopterus.* Revisions: Cabrera, Gen. Mamm. 1925, p. 209: Chasen and Kloss, Bull. Raff. Mus. 2, 1929, p. 12.

The original reference to *variegatus* is taken from Sherborn: Cabrera gives an older one, Geoff., Magas. Encyclop. 1796, i, p. 37. I cannot check these in Singapore. For the moment all specimens from the Rhio-Lingga Archipelagos are referred to *chombolis*, but I suspect that at least two races should be recognised from that area, the smaller *chombolis*, and a larger race (*e.g.* on Bintang), near to *peninsulae* and *temminckii*, but richer in colour than the former, with the sexual dimorphism much more marked than in the latter, and not quite so large as either.

The Flying Lemur is common in Bukit Timah Hill in Singapore, but I see no reference to this above.

E.J.H. Corner
May 1942

Order CHIROPTERA.

Family PTEROPODIDÆ.

Genus ROUSETTUS Gray, 1821. Rousette Bats.

Rousettus leschenaulti.

[**Rousettus leschenaulti leschenaulti (Desm.).**

✓*Pteropus leschenaulti* Desmarest, Encycl. Méth. (Mamm.) i, 1820, p. 110, No. 142: Pondicherry, India.

Distr.—Extralimital.]

Rousettus leschenaulti shortridgei Thos. and Wrought.

Rousettus shortridgei Thomas and Wroughton, Abstr. Proc. Zool. Soc. 1909, No. 68. p. 19: Kaliputjang, Java.

Distr.—Java.

Rousettus amplexicaudatus.

Rousettus amplexicaudatus amplexicaudatus (E. Geoff.).[1]

Pteropus amplexicaudatus E. Geoffroy, Ann. Mus. H. N. (Paris), XV, 1810, p. 96, pl. IV: Timor.

Distr.—Malay States; Sumatra; Engano Island, West Sumatra; Borneo.

Rousettus amplexicaudatus minor (Dobs.).

✓*Cynonycteris minor* Dobson, Journ. Asiat. Soc. Bengal, XLII, pt. II, 1873, p. 203, fig. 9: Java.

Distr.—Java.

Genus PTEROPUS Brisson, 1762.

Pteropus hypomelanus.[2] Small Flying Fox.

[**Pteropus hypomelanus hypomelanus Temm.**

Pteropus hypomelanus Temminck, Esq. Zool., 1853, p. 61: Ternate.

Distr.—Extralimital.]

Pteropus hypomelanus geminorum Mill.

Pteropus geminorum Miller, Smiths. Misc. Coll. XLV, 1903, p. 60: Mergui Archipelago.

Distr.—West Siamese islands of Panjang, Muntia, and Kuda (near Muntia); Paya Island, off Kedah, Straits of Malacca.

Pteropus hypomelanus fretensis Kl.

Pteropus hypomelanus fretensis Kloss, Journ. Fed. Malay States Mus. VI, 1916, p. 247: Jarak Island.

Distr.—Islands of Jarak and Berhala, Straits of Malacca.

Pteropus hypomelanus robinsoni And.

Pteropus hypomelanus robinsoni Andersen, Ann. Mag. Nat. Hist. (8), IV, 1909, p. 534: Rumbia Island.

Distr.—Islands of Rumbia and Lallang, Sembilan group, Straits of Malacca.

Pteropus hypomelanus simalurus Thos.

Pteropus hypomelanus simalurus Thomas, Ann. Mag. Nat. Hist. (9), XII, 1923, p. 592: Tapah Islet, near Simalur.

Distr.—Simalur Islands, West Sumatra.

Pteropus hypomelanus enganus Mill.

Pteropus enganus Miller, Proc. U.S. Nat. Mus. XXX, 1906, p. 822: Pulau Dua, Engano Islands.

Distr.—Sipora, Siberut (Mentawi Islands); Engano Islands, West Sumatra.

Pteropus hypomelanus canus And.

Pteropus hypomelanus canus Andersen, Ann. Mag. Nat. Hist. (8), II, 1908, p. 361: Pulau Pandak, North Natuna Islands.

Distr.—Islands of Pandak, Panjang, and Laut, North Natuna Islands.

Pteropus hypomelanus annectens And.

Pteropus hypomelanus annectens Andersen, Ann. Mag. Nat. Hist. (8), II, 1908, p. 361: Sirhassen Island.

Distr.—Islands of Sirhassen, Panjang and Subi, South Natuna Islands.

Pteropus hypomelanus lepidus Mill.

Pteropus lepidus Miller, Proc. Wash. Acad. Sci. II, 1900, p. 237: Saddle Island, Tambelan Islands.

Distr.—Tambelan Islands; east coast islands Malay Peninsula (the Perhentians, Gt. Redang, Lantinga, Tioman, Pemanggil, Aor); Jimaja Island, Anamba Islands.

Pteropus hypomelanus tomesi Peters.

Pteropus hypomelanus var. *tomesi* Peters, MB. Akad. Berlin, 1868, p. 626: Labuan Island.

Distr.—Coastal islands of Borneo from Sarawak to Sibutu (Labuan, Mangalum, Mantanani, Sibutu), but not recorded from the Banguey group.

Pteropus speciosus.[3]

Pteropus speciosus speciosus And.

Pteropus speciosus Andersen, Ann. Mag. Nat. Hist. (8), II, 1908, p. 364: Malanipa Island, off Zamboanga, Philippine Islands.

Distr.—Sibutu Island, North-East Borneo; islands of Solombo Besar and Mata Siri in the Java Sea.

Pteropus melanotus.[4]

[**Pteropus melanotus melanotus** Blyth.
Pteropus melanotus Blyth, Cat. Mamm. Mus. Asiat. Soc. 1863, p. 20: Nicobar Islands.
Distr.—Extralimital.]

Pteropus melanotus niadicus Mill.
Pteropus niadicus Miller, Proc. Biol. Soc. Wash. XIX, 1906, p. 64: Nias Island.
Distr.—Nias Island, West Sumatra.

Pteropus melanotus modiglianii Thos.
Pteropus modiglianii Thomas, Ann. Mus. Civ. Stor. Nat. Genova, XIV, 1894, p. 106: Engano Island.
Distr.—Engano Islands, West Sumatra.

Pteropus melanotus natalis Thos.
Pteropus natalis Thomas, Proc. Zool. Soc. 1887, pl. XLI, p. 511: Christmas Island.
Distr.—Christmas Island, Indian Ocean.

Pteropus vampyrus. Flying Fox.

Pteropus vampyrus vampyrus (Linn.).
✓ *Vespertilio vampyrus* Linn., Syst. Nat. 10th ed. I, 1758, p. 31: Java.
Vespertilio caninus Blumb., Handl. Naturg. 1797, p. 73: Java. (*n.v.*).
Vespertilio celaeno Herm., Obs. Zool. 1804, p. 13: Java.
Pteropus javanicus Desm., Encycl. Méth. (Mamm.) I, 1820, p. 109: Java.
Pteropus kelaarti Gray, Cat. Monk. etc. 1870, p. 104: Java (skull, not skin, *fide* And.).
Pteropus pteronotus Dobson, Cat. Chir. B.M. 1878, p. 48: Java.
Distr.—Java.

Pteropus vampyrus pluton (Temm.).
Pteropus pluton Temminck, Esq. Zool. 1853, p. 56: Bali.
Distr.—Bali.

Pteropus vampyrus malaccensis And.
Pteropus vampyrus malaccensis Andersen, Ann. Mag. Nat. Hist. (8), II, 1908, p. 368: Pahang.
Pteropus Sumatrensis Ludek., Geneesk. Tijdschr. Ned. Ind (9), N.S. 4, 1862, p. 46: Sumatra.
Distr.—Malay Peninsula; Sumatra; Rhio and Lingga Archipelagos; Sipora and Pagi Islands, West Sumatra; Banka; Siantan, Anamba Islands.

Pteropus vampyrus natunæ And.
Pteropus vampyrus natunae Andersen, Ann. Mag. Nat. Hist. (8), II, 1908, p. 369: Panjang Island, North Natuna Islands.
Distr.—Islands of Bunguran and Panjang, North Natuna Islands; Borneo; North Bornean islands of Banguey and Balambangan.

Pteropus alecto.

[Pteropus alecto alecto Temm.

Pteropus alecto Temminck, Mon. Mamm. II, 1837, p. 75: Celebes.

Distr.—Extralimital.]

Pteropus alecto aterrimus Matsch.

Pteropus nicobaricus b. *aterrimus* Matschie, Megachir. 1899, p. 17: Bawean Island.

Pteropus baveanus Mill., Proc. Biol. Soc. Wash. XIX, 1906, p. 63: Bawean Island.

Distr.—Bawean Island; Kangean Islands.

Genus **CYNOPTERUS** F. Cuvier, 1824.

Cynopterus sphinx. Indian Fruit Bat.

[Cynopterus sphinx sphinx (Vahl).

√*Vespertilio sphinx* Vahl, Skr. nat. Selsk. (Copen.), IV, 1797, p. 124: Tranquebar, India.

Distr.—Extralimital.]

Cynopterus sphinx titthæcheilus (Temm.).

√ *Pteropus titthaecheilus* Temminck, Mon. Mamm. I, 1825, p. 198, pl. XV: Buitenzorg, Java.

? *Pachysoma diardi* E. Geoff., Dict. Class. H.N. XIV, 1828, p. 705: Sumatra.

Distr.—Sumatra; Java; Bali.

Cynopterus sphinx major Mill.[5]

Cynopterus major Miller, Proc. Biol. Soc. Wash. XIX, 1906, p. 62: Nias Island.

Distr.—Nias Island, West Sumatra.

Cynopterus brachyotis.[6] Malaysian Fruit Bat.

Cynopterus brachyotis brachyotis (S. Müll.).

Pachysoma brachyotis S. Müller, Tijdschr. nat. geschied. physiol. V, pt. 1, 1838, p. 146: Borneo.

? *Pachysoma duvauceli* E. Geoff., Cours. Hist. Nat. Mamm. 1828, p. 28: Sumatra.

? *Pachysoma brevicaudatum* Is. Geoff., Dict. Class. H.N. XIV, 1828, p. 705: Sumatra.

Cynonycteris grandidieri Peters, Mon. Ber. Akad. Berl. 1869, p. 394: "Zanzibar".

Cynopterus montanoi Robin, Bull. Soc. Philom. Paris (7), V, 1881, p. 90: Kessang, near Malacca town.

Distr.—Malay States; Pulau Pisang, Straits of Malacca; east coast islands of Redang group, Tinggi, Babi and Sri Buat; Rhio Archipelago; Sumatra; Batu Islands; Billiton; Banka; Borneo.

Cynopterus brachyotis angulatus Mill.

Cynopterus angulatus Miller, Proc. Acad. Nat. Sci. Philad. 1898, p. 316: Trang, Peninsular Siam.

Distr.—Peninsular Siam and its west coastal islands (Junk Seylon, Lontar, Muntia); east coastal islands of Koh Pennan and Koh Samui; North and South Natuna Islands; Anamba Islands.

Cynopterus brachyotis javanicus And.

Cynopterus brachyotis javanicus Andersen, Ann. Mag. Nat. Hist. (8), VI, 1910. p. 624: Buitenzorg, West Java.

Distr.—Java; Bali.

Cynopterus brachyotis insularum And.

Cynopterus brachyotis insularum Andersen, Ann. Mag. Nat. Hist. (8), VI, 1910, p. 624: Kangean Island.

Distr.—Kangean Island.

Cynopterus brachyotis minutus Mill.

Cynopterus minutus Miller, Proc. Biol. Soc. Wash. XIX, 1906, p. 63: Nias Island.

Distr.—Nias Island, West Sumatra.

*** Cynopterus brachyotis babi Lyon.**

Cynopterus babi Lyon, Proc. U.S. Nat. Mus., XLII, 1916, p. 438; Babi Island.

Distr.—Babi Island, near Simalur, west coast Sumatra.

Cynopterus brachyotis pagensis Mill.

Cynopterus pagensis Miller, Proc. Biol. Soc. Wash. XIX, 1906, p. 62: North Pagi Island.

Distr.—Islands of Pagi, Siberut and Sipora, Mentawi group, West Sumatra.

Cynopterus horsfieldi. Horsfield Fruit Bat.

Cynopterus horsfieldi horsfieldi Gray.

Cynopterus horsfieldi Gray, List. Mamm. Brit. Mus. 1843, p. 38: Java.

Distr.—Java.

Cynopterus horsfieldi persimilis And.

Cynopterus persimilis Andersen, Ann. Mag. Nat. Hist. (8), X, 1912, p. 640: Sarawak.

Distr.—Borneo.

Cynopterus horsfieldi lyoni And.

Niadias minor Lyon, Proc. U.S. Nat. Mus. XXXIV, 1908, p. 665: Siak River, East Sumatra (not *C. minor* Trouess. 1878).

Cynopterus horsfieldi lyoni Andersen, Cat. Chir. Brit. Mus. 2nd. ed. I, 1912, p. 827: *nom. nov.*

Distr.—Sumatra; Malay States.

Cynopterus horsfieldi princeps Mill.

Cynopterus princeps Miller, Proc. Biol. Soc. Wash. XIX, 1906, p. 61: Nias Island.

Distr.—Nias Island, West Sumatra.

Cynopterus harpax Thos. and Wrought.
Cynopterus (Niadius) harpax Thomas and Wroughton, Ann. Mag. Nat. Hist. (8), III, 1909, p. 439: Semangko Pass, Malay States, 3,000 ft.
Distr.—Malay States.

Genus **MEGÆROPS** Peters, 1865.

Megærops ecaudatus (Temm.). Tail-less Fruit Bat.
Pachysoma ecaudatum Temminck, Mon. Mamm. II, 1837, p. 94: Padang, West Sumatra.
Distr.—Malay States; Sumatra; Borneo.

Genus **DYACOPTERUS** Andersen, 1921.

Dyacopterus spadiceus (Thos.).
Cynopterus spadiceus Thomas, Ann. Mag. Nat. Hist. (6), V, 1890, p. 235: Baram, Sarawak.
Distr.—Borneo.

Dyacopterus brooksi Thos.
Dyacopterus brooksi Thomas, Ann. Mag. Nat. Hist. (9), V, 1920, p. 284: Lebang Tandai, Upper Ketuan River, 100 miles north of Bencoolen, Sumatra.
Distr.—Sumatra.

Genus **BALIONYCTERIS** Matschie, 1899.

Balionycteris maculata. Spotted-winged Fruit Bat.

Balionycteris maculata maculata (Thos.).
Cynopterus maculatus Thomas, Ann. Mag. Nat. Hist. (6), XI, 1893, p. 341: Sarawak.
Distr.—Borneo.

Balionycteris maculata seimundi Kloss.
Balionycteris maculata seimundi Kloss, Journ. Fed. Malay States Mus. X, 1921, p. 229: Pahang, Malay States.
Distr.—Malay States; Durian and Galang Islands, Rhio Archipelago.

Genus **ÆTHALOPS** Thomas, 1923.

Æthalops alecto (Thos.).
Æthalodes alecto Thomas, Ann. Mag. Nat. Hist. (9), XI, 1923, p. 251: Indrapura Peak, Sumatra, 7,300 ft.
Distr.—Sumatra.

* **Æthalops aequalis** All.
Aethalops aequalis Glover, M. Allen, Journ. Mamm. XIX, 1938 p. 497: Mt. Kinabalu, British North Borneo, 5,500 ft.
Distr.—Borneo.

Genus CHIRONAX Andersen, 1912.

Chironax melanocephalus (Temm.).[7] Black-capped Fruit Bat.

Pteropus melanocephalus Temminck, Mon. Mamm. I, 1825, p. 190: Bantam, West Java.

Distr.—Malay States; Sumatra; Nias Island; Java.

Genus PENTHETOR Andersen, 1912.

Penthetor lucasi (Dobs.). Dusky Fruit Bat.

Cynopterus (*Ptenochirus*) *lucasi* Dobson, Ann. Mag. Nat. Hist. (5), VI, 1800, p. 163: Sarawak.

Distr.—Malay States; Rhio Archipelago; Borneo.

Genus EONYCTERIS Dobson, 1873. Cave Fruit Bats.

Eonycteris spelæa (Dobs.)[8]

Macroglossus spelaeus Dobson, Proc. Asiat. Soc. Beng. 1871, p. 105: Moulmein, Burma.

Distr.—Malay Peninsula; Sumatra; Borneo; Java.

Eonycteris major And.

Eonycteris major Andersen, Ann. Mag. Nat. Hist. (8), VI, 1910, p. 625: Mt. Dulit, Sarawak.

Dist.—Borneo.

Genus MACROGLOSSUS F. Cuvier, 1824.[9]

Macroglossus minimus. Long-tongued Fruit Bats.

Macroglossus minimus minimus (E. Geoff.).

Pteropus minimus E. Geoffroy, Ann. Mus. H.N. (Paris), XV, 1810, p. 97: Java.

Pteropus rostratus Horsf., Zool. Res. Java, fasc. 3, pl., 1821: Java.

Macroglossa kiodotes Less., Man. Mamm. 1827, p. 115: Java (nom. nov., *minimus*).

Macroglossa horsfieldii Less., Man. Mamm. 1827, p. 115: Java (nom. nov., *rostratus*).

Distr.—Java; Kangean Islands; Bali (*?subsp.*).

Macroglossus minimus sobrinus And.

Macroglossus minimus sobrinus Andersen, Ann. Mag. Nat. Hist. (8), VII, 1911, p. 642: Perak, Malay States.

Distr.—Malay States; Sumatra; Nias Island; Java.

Macroglossus minimus fraternus Chas. and Kl.

Macroglossus minimus fraternus Chasen and Kloss, Proc. Zool. Soc. 1927, p. 836: Sipora Island.

Distr.—Sipora and Siberut Islands, Mentawi Islands, West Sumatra.

Macroglossus lagochilus.

Macroglossus lagochilus lagochilus Matsch.

Macroglossus lagochilus Matschie, Megachir. 1899, p. 96: Buru, Moluccas.

Distr.—Malay Peninsula; Sirhassen Island; Nias Island; Borneo; ? Sri Buat Island, Pahang coast; ? Bunguran Island, North Natuna Islands.

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1 *Rousettus a. amplexicaudatus.* Specimens from the Batu Caves near Kuala Lumpur in Selangor belong to this species, as do some collected in Tenasserim by Shortridge. The latter have been recorded as *leschenaulti*. I also have *amplexicaudatus* from the mountains of North Siam, where *R. leschenaulti* also occurs.

2 *Pteropus hypomelanus.* For the Peninsular forms *see* And., Journ. F.M.S. Mus. IV, 1911, p. 212; Kloss, *op. cit.* VI, 1916, p. 245. In Malaysia it is very rare to find forms of the smaller *Pteropus* (*hypomelanus* and *melanotus*) living on the same island as any form of *P. vampyrus*. They are almost entirely mutually exclusive in geographical ranges, but Kloss collected both *P. h. enganus* and *P. v. malaccensis* on Sipora; and specimens of both species have been taken on Panjang Island in the North Natuna Islands (not to be confused with the small island of the same name in the southern group).

3 *Pteropus speciosus.* A Malaysian outlier of a species occurring in Celebes and further east. There is, no doubt, an older name than *speciosus* available for the "species", but I have no knowledge of the extralimital races.

4 From *Pteropus melanotus* to *natalis* is a long stretch, but the appearance of the intervening forms provides sufficient grounds to justify the use of a trinomial.

5 *Cynopterus sphinx.* In specimens from alcohol I measure the ear of *major* as 18·5–20 mm. against 19–20 mm. in *titthaecheilus*. Andersen regards *major* as the "representative" of *angulatus*, and not of *sphinx*.

6 *Cynopterus brachyotis.* The arrangement here proposed is rather simpler than that adopted by Andersen who thought that two subspecies (*angulatus* and *brachyotis*) occurred together in the Malay Peninsula and Sumatra. Some of Andersen's material was old and a few dealers' skins were without precise locality. I have had the advantage of examining long series of recently collected and exactly localized specimens, all of which I have measured personally. The species is a common house bat in most parts of Malaysia. My own view is that in Malaysia we have a large form in the north of the Malay Peninsula: it has spread to a few adjacent small island groups. The remainder of the area, except for some other differentiated forms, is occupied exclusively by *brachyotis*.

Topotypical *brachyotis* (Borneo) varies in size more than was known to Andersen and in one locality can produce a forearm range of 57–67·7 mm. Sody has even recorded an exceptionally large specimen with a forearm of 69 mm. caught together with some more normal specimens (Natuur. Tijds. Ned. Ind. XC, 1930, p. 265). All the specimens I have examined from Sumatra, the neighbourhood of Singapore and the various Malay States, north to Penang Island and Kedah, have the forearm 68 mm. or less in length, but the maximum is rare and the average length of the forearm in Kedah is 62·7 mm. against 63 mm. in my series of topotypical *brachyotis*. Unfortunately I have no material from Patani and from the country between Kedah and the type locality of *angulatus* in Peninsular Siam. Furthermore, no specimens from the Langkawi Islands are present in the Raffles Museum collection. This gap between the northern limit of the range of *brachyotis* and the southern limit of that of *angulatus* is very curious and unless the luck of the collecting has been most exceptionally uneven it suggests that this very common bat is rare in the intermediate, but to the systematist, most interesting strip of country. I have many *angulatus* (forearms 67·5–73 mm.) from localities from Trang in the south to Bangkok, and on to North Siam where *C. sphinx* also occurs. Specimens from the Mentawi Islands, originally described as *pagensis* by Miller, have been placed with *angulatus* by several subsequent authors, but the ears are small, less than 17 mm. in length, and often much less, against 17 mm. or over in *angulatus*.

In 1915 (Journ. F.M.S. Mus. v, p. 220) a discussion between Andersen and Kloss as to the dividing line between *sphinx* and *angulatus* was chiefly concerned with the length of the ears. Except in the case of one observer working at close intervals of time I doubt if this measurement can yet be taken with sufficient precision to be of diagnostic value. Taking a well preserved bat from alcohol I find that the difference between an "easy" measurement of an ear in a natural position and the same ear reasonably flattened to facilitate measuring can be 3·5 mm. In its type locality I cannot get smaller figures for *angulatus* than 17·5–20·5 mm. Unfortunately I have no *sphinx* in a fit state for comparison.

7. *Chironax.* Specimens examined from North Sumatra; and Selangor, Malay States.

8 *Eonycteris spelaea.* For the occurrence in Borneo *see* Chas., Bull. Raffles Mus. 5, 1931, p. 110.

9 *Macroglossus.* I have retained *minimus* and *sobrinus* as subspp., but the ranges seem curiously mixed in Java. Material is not available to justify any alteration. *M. lagochilus* has a much wider range than has hitherto been supposed. In the Raffles Museum are alcohol specimens from Borneo, Singapore, various Malay States, Peninsular Siam, Nias, and Sirhassen Island. Skins are from the tiny island of Sri Buat off the

Pahang coast, and from Bunguran Island in the North Natunas, but as the noses of the skins are much shrivelled the identifications from these two last named localities are not absolutely certain.

Family RHINOPOMIDÆ.

Genus **RHINOPOMA** E. Geoffroy St. H., 1813.[1]

Rhinopoma hardwickii Gray — Mouse-tailed Bat.
Rhinopoma hardwickii J. E. Gray, Zool. Misc. (Gray), 1831, p. 37: India.
Distr.—Peninsular Siam.

* **Rhinopoma sumatræ** Thos.
Rhinopoma sumatrae Thomas, Ann. Mag. Nat. Hist. (7), XI, 1903, p. 497: near Lake Toba, North Sumatra.
Distr.—Sumatra.

Family EMBALLONURIDÆ.

Genus **EMBALLONURA** Temminck, 1838.[2]

Emballonura monticola. — Sheath-tailed Bats.

Emballonura monticola monticola Temm.
Emballonura monticola Temminck, Tijdschr. nat. geschied. physiol. V, 1838, p. 25: Java.
Emballonura peninsularis Mill., Proc. Acad. Nat. Sci. Philad. 1898, p. 323: Trang, Peninsular Siam.
Emballonura anambensis Mill., Proc. Wash. Acad. Sci. II, 1900: Mobur, Anamba Islands.
Emballonura pusilla Lyon, Proc. U.S. Nat. Mus. XL, 1911, p. 132: Kendawangan River, South-West Borneo.
Distr.—Malay Peninsula and coastal islands; Anamba Islands; Sumatra; Rhio Archipelago; Banka; Billiton; Engano; Babi and Batu Islands; Nias and Mentawi Islands; Borneo and coastal islands; Karimata Islands; Java.

Emballonura rivalis Thos.
Emballonura monticola rivalis Thomas, Ann. Mag. Nat. Hist. (8), XV, 1915, p. 140: Bida, Sarawak.
Distr.—Borneo.

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[1] *Rhinopoma.* Revision: Thos., Ann. Mag. Nat. Hist. (7), XI, 1903, p. 497 wherein *sumatrae* is allied to *microphyllum* (Egypt) group; and *hardwickii* to the *cystops* (also Egypt) group: *see* also Wroughton, Journ. Bomb. Nat. Hist. Soc. XXI, 1912, p. 767.

[2] *Emballonura.* Revision: Thos., Ann. Mag. Nat. Hist. (8), XV, 1915, p. 137. I cannot split *monticola* as defined above and both broad and narrow types of skull occur in the Malay States: specimens are from as far north as Bangkok in Siam. Typical *monticola* seems much larger than the original description indicates. In Borneo, *monticola* and *rivalis* occur side by side.

Genus SACCOLAIMUS Lesson, 1842.

Saccolaimus saccolaimus. Pouch-bearing Bats.

Saccolaimus saccolaimus saccolaimus (Temm.).

Taphozous saccolaimus Temminck, Tijdschr. nat. geschied. physiol. V, 1838, p. 14: Java.

Distr.—Java.

Saccolaimus saccolaimus crassus (Blyth).[1]

Taphozous crassus Blyth, Journ. Asiat. Soc. Beng. XIII, 1844, p. 491: Mirzapore, Allahabad.

Distr.—Malay Peninsula; Sumatra.

Saccolaimus affinis (Dob.).[2] White-breasted Bat.

Taphozous affinis Dobson, Ann. Mag. Nat. Hist. XVI, 1875, p. 232: Labuan Island.

Distr.—Malay States; Sumatra; Banka; Borneo; Java.

* **Saccolaimus flavimaculatus** Sody[3].

Saccolaimus flavimaculatus Sody, Natuur. Tijdschr. Ned. Ind. XCI, 1931, p. 355: Kutei, East Borneo.

Distr.—Borneo.

Genus TAPHOZOUS E. Geoffroy St. H., 1818.[4]

Taphozous longimanus. Tomb Bats.

[**Taphozous longimanus longimanus** Hardw.

Taphozous longimanus Hardwicke, Trans. Linn. Soc. XIV, 1825, p. 525: Calcutta.

Distr.—Extralimital.]

Taphozous longimanus albipinnis Thos.

Taphozous longimanus albipinnis Thomas, Ann. Mag. Nat. Hist. (7), II, 1898, p. 246: Labuan Island.

Distr.—Malay Peninsula; Sumatra; Borneo.

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[1] *S. saccolaimus.* A few specimens from Siam, (Peninsular Siam to the frontier of South-West French Laos) and the Malay Peninsula are slightly larger and have the white areas on the wings more extensive than in three topotypes of *saccolaimus:* no Sumatran specimens have been handled.

[2] *S. affinis.* Not seen from north of the Malay States.

[3] Sody later (Temminckia, II, 1937, p. 232) regarded the type and unique specimen of this form, which I have not examined, as *S. affinis flavimaculatus,* but this gives the two supposed subspecies of *S. affinis* a very queer distribution. Perhaps *flavimaculatus* is *crassus*, or a Bornean representative of *saccolaimus*.

[4] *Taphozous.* Revision: Thos., Journ. Bomb. Nat. Hist. Soc. XXIV, 1915, p. [illegible]7. For generic names of this and allied genera *see* Thos., Ann. Mag. Nat. Hist. (9), IX, 1922, p. 266.

Taphozous longimanus kampenii Jent.

Taphozous kampenii Jentink, Notes Leyd. Mus. XXIX, 1907, p. 65: Java.

Distr.—Java.

Taphozous theobaldi.

Taphozous theobaldi theobaldi Dobs.

Taphozous theobaldi Dobson, Proc. Asiat. Soc. Beng. 1872, p. 152: Tenasserim.

Distr.—Malay States; Java.

Taphozous kachhensis.

[**Taphozous kachhensis kachhensis Dob.**

Taphozous kachhensis Dobson, Journ. Asiat. Soc. Beng. 1872, p. 221: Cutch.

Distr.—Extralimital.]

Taphozous kachhensis nudaster Thos.

Taphozous kachhensis nudaster Thomas, Journ. Bomb. Nat. Hist. Soc. XXIV, 1915, p. 59: Pagan, Burma.

Distr.—Malay States.

Taphozous melanopogon.[1]

Taphozous melanopogon melanopogon Temm.

Taphozous melanopogon Temminck, Mon. Mamm. II, 1841, p. 287: Bantam, West Java.

Distr.—Java.

Taphozous melanopogon fretensis Thos.

Taphozous melanopogon fretensis Thomas, Journ. Fed. Malay States Mus. VII. 1916, p. 5: Terutau Island, Straits of Malacca.

Distr.—Malay Peninsula and coastal islands; Borneo.

*** Taphozous melanopogon cavaticus Holl.**

Taphozous cavaticus Hollister, Proc. Biol. Soc. Wash., XXVI, 1913, p. 159: near Padang, West Sumatra.

Distr.—Sumatra.

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[1] *Taphozous melanopogon fretensis* is variable in colour and on description I cannot see how it differs from *cavaticus* of which no specimens are available for study. Furthermore, specimens from further north in India, Burma and Siam etc. seem like *cavaticus* in size, and *bicolor* Temm. (Calcutta) has to be considered. In Upper Burma this bat is usually dark in colour with dark wing membranes: in the Malay States very pale specimens predominate and the wings are always whitish. In Tenasserim and Bangkok the common form seems to be a pale bat with dark wings. The only specimens I have seen from Borneo are from the north. In the absence of topotypes of *melanopogon* I can only say that these Bornean specimens are very near to *fretensis*, but perhaps separable by whiter under parts and by a rather smaller average length of the forearm.

Family MEGADERMIDÆ.

Genus MEGADERMA E. Geoffroy St. H., 1810.

Megaderma spasma.[1] False Vampires.

[**Megaderma spasma spasma (Linn.).**
Vespertilio spasma Linn., Syst. Nat., ed. 10, 1758, p. 32: Celebes.
Distr.—Extralimital.]

Megaderma spasma medium And.
Megaderma spasma medium Andersen, Ann. Mag. Nat. Hist. (9), II, 1918, p. 383: Singapore Island.
Distr.—Malay Peninsula; Terutau Island; Rhio Archipelago; Sumatra (North).

Megaderma spasma trifolium Geoff.
Megaderma trifolium E. Geoffroy, Ann. Mus. H. N. (Paris), XV, 1810, p. 193: Java.
Distr.—Java (part); Kangean Islands; Sumatra (part); Borneo; South Natuna Islands; Tambelan Islands.

* **Megaderma spasma pangandarana Sody.**
Megaderma spasma pangandarana Sody, Natuur. Tijdschr. Ned. Ind. XCVI, 1936, p. 46: Pangandarana, South-Central Java.
Distr.—Java (part).

Megaderma spasma carimatæ Mill.
Megaderma carimatae Miller, Proc. U.S. Nat. Mus. XXXI, 1906, p. 63: Karimata Island.
Distr.—Karimata Island, West Borneo.

Megaderma spasma abditum Chas.[1]
Megaderma spasma abditum Chasen, Bull. Raffles Mus. 15, 1940, p. 35: Pulau Aor.
Distr.—Aor Island, off Johore, east coast Malay States.

* **Megaderma spasma natunæ And. and Wrought.**
Megaderma natunae Andersen and Wroughton, Ann. Mag. Nat. Hist. (7), XIX, 1907, p. 131: Bunguran Island.
Distr.—Bunguran Island, North Natuna Island.

Megaderma spasma kinabalu Chas.[1]
Megaderma spasma kinabalu Chasen, Bull. Raffles Mus. 15, 1940, p. 35: Mt. Kinabalu, British North Borneo, 3,000 ft.
Distr.—Borneo (part).

* **Megaderma spasma lasiæ Lyon.**
Megaderma lasiae Lyon, Proc. U.S. Nat. Mus. LII, 1916, p. 439: Lasia Island, West Sumatra.
Distr.—Lasia and Babi Islands, West Sumatra.

***Megaderma spasma niasense* Lyon.**
Megaderma niasense Lyon, Proc. U.S. Nat. Mus. LII, 1916, p. 440: Nias Island.
Distr.—Nias Island, West Sumatra.

***Megaderma spasma siumatis* Lyon.**
Megaderma siumatis Lyon, Proc. U.S. Nat. Mus. LII 1916, p. 439.
Distr.—Siumatis Island, West Sumatra; (? Simalur also).

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[1] *Megaderma spasma.* Revisions: And. and Wrought., Ann. Mag. Nat. Hist. (7), XIX, 1907, p. 129; And., Ann. Mag. Nat. Hist. (9), II, 1918, p. 383. Fair series show that *medium*, *trifolium*, *carimatae*, and *minus* (Siam) are well founded, but it will be seen that I have proposed a few minor amendments to the ranges. Of the other subspecies hitherto proposed I have no material. The only specimen examined from Sumatra is from the north; it is very large (forearm 62·3 mm.). According to its author *pangandarana* has a curious range in Java and is surrounded by another subspecies. It also needs comparison with *medium*. The only specimens seen from the Bornean lowlands are from British North Borneo. They lack skulls and may be referable to *kinabalu*, but I think not. In this species the skull provides a better character for racial distinction than the forearm the length of which does not vary much. The skull of *medium* averages larger than that of *trifolium* and that of *carimatae* is very small and narrow. On the small island of Pulau Aor, off the east coast of Johore, lives a form with a small skull like that of *carimatae*, but it lacks the noticeably large ears of this latter form, these being about as in mainland animals. This race can be known as:—

Megaderma spasma abditum subsp. nov.

Type.—Unsexed skin and skull collected on Pulau Aor, east coast Malay Peninsula on 1st May, 1927 by N. Smedley. Raffles Museum No. 536.

Measurements.—Forearm, 57·7; lower leg including claws, 46; greatest length of skull to base of canine, 24·2; greatest width (zygomatic), 13·7; upper tooth row, alveoli, 9·2 mm. Forearms of five other specimens.—56·7–59 mm.; three other skulls, greatest length, 23·7–24·6 mm.; ears from crown, 29–30 mm.

Finally, on the lower slopes of Mt. Kinabalu in British North Borneo I found an undescribed form of this species in which the skull is so large that it needs no comparison with any other known form. This can be known as:—

Megaderma spasma kinabalu subsp. nov.

Type.—Adult female (in alcohol), collected at Kiau, Mt. Kinabalu, 3,000 ft. on 17th April, 1929. Raffles Museum No. 61, 1929.

Measurements of two females (type first).—forearm, 60·2, 60·3; lower leg with claws, 47·6, 47·8 mm. *Skull.*—greatest length to front of canine (alveoli), 27, 27·1; greatest width, zygomatic, 16·7, 16·3; upper tooth row to front of canine (alveoli), 9·3, 9 mm.

Megaderma lyra.[1] **Indian False Vampire Bat.**

[Megaderma lyra lyra E. Geoff.

Megaderma lyra E. Geoffroy, Ann. Mus. H. N. (Paris), XV, 1810, p. 190: India.

Distr.—Extralimital.]

Megaderma lyra sinensis (And. and Wrought.).

Eucheira sinensis Andersen and Wroughton, Ann. Mus. Nat. Hist. (7), XIX, 1907, p. 136: Amoy.

Distr.—Malay States.

Family NYCTERIDÆ.

Genus NYCTERIS E. Geoffroy, 1803.[2]

Nycteris javanica Geoff. **Hollow-faced Bat.**

Nycteris javanica javanica Geoff.

Nycteris javanicus E. Geoffroy, Ann. Mus. H. N. (Paris), XX, 1813, p. 20: Java.

Distr.—Java.

Nycteris javanica tragata (And.).

Petalia tragata Andersen, Ann. Mag. Nat. Hist. (8), X, 1912, p. 546: Sarawak.

Distr.—Malay Peninsula; Borneo.

Family RHINOLOPHIDÆ.

Genus RHINOLOPHUS Lacépède, 1799.[3]

Rhinolophus malayanus[4] **Bonh.** **Leaf-nosed Bats.**

Rhinolophus malayanus Bonhote, Fasc. Malayenses, Zool. 1, 1903, p. 15: Biserat, Patani, Siamese Malaya.

Distr.—Peninsular Siam.

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[1] *Megaderma lyra.* Revision: And. and Wrought., Ann. Mag. Nat. Hist. (7), XIX, 1907, p. 135. The skull of a single example of this bat from Perak is rather too large for *M. l. lyra*, and judging by the shape of the prenasal notch the Malayan race is either *sinensis*, or near this race. No direct comparison of material has been possible.

[2] *Nycteris.* Revision: And., Ann. Mag. Nat. Hist. (8), X, 1912, p. 546.

[3] *Rhinolophus.* Revisions: Andersen, A.M.N.H. (7), XVI, 1905, p. 243 (*philippinensis* group); *t.c.* p. 281 (*arcuatus* group); *t.c.* p. 289 (*macrotis* group); P.Z.S. 1905, II, p. 75 (*simplex* group); p. 121 (*lepidus* group); A.M.N.H. (7), XVI, 1905, p. 648 (a list).

[4] *Rhin. malayanus* and the succeeding five forms given above are very much alike and will possibly eventually be grouped in two species (formenkreise), but in the present state of our knowledge I should not care to attempt any extensive linking. Subspecies of *borneensis* are certainly *spadix* which can only be distinguished on average characters; and possibly *malayanus* and *javanicus* which are rather more distinct. *Stheno* lives side by side with the above mentioned forms in many places: *nereis*, however, seems to connect the two groups.

RHINOLOPHIDÆ

Rhinolophus borneensis.

Rhinolophus borneensis borneensis Peters.

Rhinolophus borneensis Peters, Mon. Ber. Akad. Berlin, 1861, p. 709: Labuan.

Distr.—Labuan Island; Banguey Island; North Borneo.

Rhinolophus borneensis spadix Mill.

Rhinolophus spadix Miller, Proc. Wash. Acad. Sci. III, 1901, p. 136: Sirhassen Island.

Distr.—South Natuna Islands; Karimata Islands.

Rhinolophus importunus Chas.

Rhinolophus importunus Chasen, Treubia, XVII, 1939, p. 188: near Wijnkoops Bay, south coast Java.

Distr.—Java.

Rhinolophus javanicus And.

Rhinolophus javanicus Andersen, Ann. Mag. Nat. Hist. (9), II, 1918, p. 375: South Java.

Distr.—Java.

Rhinolophus madurensis And.

Rhinolophus madurensis Andersen, Ann. Mag. Nat. Hist. (9), II, 1918, p. 375: Madura.

Distr.—Madura Island.

Rhinolophus stheno And.

Rhinolophus stheno Andersen, Proc. Zool. Soc. 1905, p. 91: Selangor, Malay States.

Distr.—Malay Peninsula; Sumatra; Java.

Rhinolophus nereis And.

Rhinolophus nereis Andersen, Proc. Zool. Soc. 1905, p. 90: Siantan Island.

Distr.—Siantan Island, Anamba Islands; Bunguran, North Natuna Islands.

Rhinolophus robinsoni And.

Rhinolophus robinsoni Andersen, Ann. Mag. Nat. Hist. (9), II, 1918, p. 375: Bandon, Peninsular Siam.

Distr.—Malay Peninsula.

Rhinolophus klossi And.

Rhinolophus klossi Andersen, Ann. Mag. Nat. Hist. (9), II, 1918. p. 375: Pemanggil Island.

Distr.—Tioman, Pemanggil and Aor Islands, east coast Malay Peninsula.

Rhinolophus affinis.

Rhinolophus affinis affinis Horsf.

Rhinolophus affinis Horsfield, Zool. Researches Java, 1823, pl. figs. a, b: Java.

Distr.—Java.

Rhinolophus affinis superans And.

Rhinolophus affinis superans Andersen, Proc. Zool. Soc. 1905, p. 104: Pahang.

Distr.—Malay Peninsula; Sumatra.

Rhinolophus affinis nesites And.

Rhinolophus affinis nesites Andersen, Proc. Zool. Soc. 1905, p. 104: Bunguran Island.

Distr.—Bunguran Island, North Natuna Islands; Siantan Island, Anamba Islands.

Rhinolophus refulgens.

Rhinolophus refulgens refulgens And.

Rhinolophus refulgens Andersen, Proc. Zool. Soc. 1905, p. 124: Perak.

Distr.—Malay Peninsula; islands of Tioman and Aor, off the east coast.

Rhinolophus refulgens cuneatus And.

Rhinolophus refulgens cuneatus Andersen, Ann. Mag. Nat. Hist. (9), II, 1918, p. 376: Deli, North-East Sumatra.

Distr.—Sumatra.

Rhinolophus pusillus Temm.[1]

Rhinolophus minor Horsf., Zool. Researches Java, 1823, pl. figs. c, d: Java (*nec* Kerr, 1792).

Rhinolophus pusillus Temminck, Tijdschr. nat. geschied. physiol. I (i), 1834, p. 29: Java.

Distr.—Java.

* **Rhinolophus minutillus Mill.**

Rhinolophus minutus Miller, Proc. Wash. Acad. Sci. II, 1900, p. 235: Siantan Island (*nec* Montagu, 1808).

Rhinolophus minutillus Mill., Proc. Biol. Soc. Wash. XIX, 1906, p. 41: *nom. nov.*

Distr.—Siantan Island, Anamba Islands.

Rhinolophus acuminatus.

Rhinolophus acuminatus acuminatus Peters.

Rhinolophus acuminatus Peters, Mon. Ber. Akad. Berlin, 1871, p. 308: Java.

Distr.—Java.

Rhinolophus acuminatus audax And.

Rhinolophus acuminatus audax Andersen, Proc. Zool. Soc. 1905, p. 133: Lombok.

Distr.—Bali.

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[1] *R. pusillus* and *minutillus* are perhaps allied subspecies. I have never seen a bat of this restricted group from the Malay Peninsula, Sumatra, or Borneo. The only specimen in the Raffles Museum is from Chiengmai in North Siam (? *R. blythi szechwanus*).

Rhinolophus acuminatus sumatranus And.[1]
Rhinolophus sumatranus Andersen, Proc. Zool. Soc. 1905, p. 133: Lower Langkat, Sumatra.
Distr.—Sumatra; Borneo.

* **Rhinolophus acuminatus calypso And.**
Rhinolophus calypso Andersen, Proc. Zool. Soc. 1905, p. 134: Engano Island.
Distr.—Engano Island, West Sumatra.

* **Rhinolophus acuminatus circe And.**
Rhinolophus circe Andersen, Proc. U.S. Nat. Mus. XXIX, 1906, p. 657: Nias Island.
Distr.—Nias Island, West Sumatra.

Rhinolophus philippinensis.[2]

[**Rhinolophus philippinensis philippinensis Waterh.**
Rhinolophus philippinensis Waterhouse, Proc. Zool. Soc. 1843, p. 68: Luzon.
Distr.—Extralimital.]

Rhinolophus philippinensis sanborni Chas.[3]
Rhinolophus philippinensis sanborni Chasen, Bull. Raffles Mus. 15, 1940, p. 39: British North Borneo.
Distr.—Borneo.

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[1] *R. acuminatus.* A large series of this bat from a cave in N.E. Sumatra is very variable in size, the forearms of adult males measuring 47–52 mm., and yet I cannot make out that the series includes more than one form. A single specimen from North Borneo (recorded in detail in Bull. Raff. Mus. 6, 1931, p. 48) is provisionally placed with *sumatranus*, but it probably represents an undescribed Bornean race.

[2] ? *Rhinolophus luctus* var. *rufa* Eyd. and Gerv. (Manila), 1839.

[3] **Rhinolophus philippinensis sanborni** subsp. nov.

Like *R. p. philippinensis* of the Philippine Islands, but the forearm longer.

Type.—Adult male (skin and skull), collected at the Tapadong Caves, near Lahad Datu, on the east coast of British North Borneo, on 10th January, 1931, by P. Orolfo. Raffles Museum No. 2758.

External dimensions in the flesh.—Total length, 81; forearm, 50·7 (47·1); tail, 26 (28·8); tibia, 21·5 (21·7); 3rd met. 35 (34·6), 1st phal. 14·2 (13·9), 2nd phal. 20·5 (19·2); 4th met. 35·3 (35·6), 1st phal. 10·1 (9·6), 2nd phal. 12·3 (11·7). Ears from crown, 25, greatest width 23 mm.

Skull.—Greatest length, 21·8 (19·6); condylo-basal length, 16·7 (16·8); palatal length, 3·5 (3); zygomatic width, 9·4 (8·9); mastoid width, 10·4 (9·7); upper tooth row, 8·1 (7); across canines, 4·5 (4·4); greatest width of nasal swellings, 6 mm.

Colour.—Varies from a rather dull hair-brown to a brighter colour near chestnut: the base of the fur is everywhere slightly

Rhinolophus luctus.[1]

Rhinolophus luctus luctus Temm.

Rhinolophus luctus Temminck, Mon. Mamm. II, 1835, p. 24, pl. XXX: Java.

Rhinolophus geminus And., Ann. Mag. Nat. Hist. (7), XVI, 1905, p. 253: Java.

Distr.—Java; Sumatra (part).

Rhinolophus luctus morio Gray.

Rhinolophus morio J. E. Gray, Ann. Mag. Nat. Hist. (1), X, 1842, p. 257: Singapore.

Distr.—Malay Peninsula; Sumatra (part).

Rhinolophus luctus fœtidus And.

Rhinolophus morio foetidus Andersen, Ann. Mag. Nat. Hist. (9), II, 1918, p. 378: Baram, Sarawak.

Distr.—Borneo.

Rhinolophus sedulus.

Rhinolophus sedulus sedulus And.

Rhinolophus sedulus Andersen, Ann. Mag. Nat. Hist. (7), XVI, 1905, p. 247: Sarawak.

Distr.—Borneo.

Rhinolophus sedulus edax And.

Rhinolophus edax Andersen, Ann. Mag. Nat. Hist. (9), II, 1918, p. 378: Singapore.

Distr.—Malay States.

darker. The hairs have pale tips which are most conspicuous on the under surface which therefore shows up slighter paler than the upper parts.

Specimens examined.—Six males and three females from the Madai and Tapadong Caves on the east coast of British North Borneo. Forearms.—Males, 50, 50, 51, 51, 52, 53; females, 51, 53, 54 mm.

Remarks.—This species was recorded for the first time from Borneo in Bull. Raffles Mus. 5, 1931, p. 111. Since then Mr. C. C. Sanborn has been kind enough to send me measurements of the type of *philippinensis* collected in Luzon by Hugh Cuming, and now in the British Museum. These measurements are given in brackets above. That the Bornean and Philippine forms would eventually prove to be separable was to be expected.

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[1] *Rhinolophus luctus.* Although by lumping *geminus* and *luctus* we get a range of 64·9–73 mm. for the Javan form this is no greater than that shown by the Malayan subspecies *morio* which we know varies 63·5–75 mm. Mr. C. C. Sanborn who has kindly sent me some notes about the specimens in the Leyden Museum tells me that the type of *luctus* has a forearm of 64·9 mm. Andersen referred specimens from Korinchi in Sumatra to *luctus*, but some specimens from near Medan in N.E. Sumatra are nearer to *morio*.

Rhinolophus trifoliatus.

Rhinolophus trifoliatus trifoliatus Temm.
Rhinolophus trifoliatus Temminck, Tijdschr. nat. geschied. physiol. I, 1834, p. 24: Java.
Distr.—Malay Peninsula, Sumatra, Rhio Archipelago, Banguey Island, Borneo, Java.

* **Rhinolophus trifoliatus solitarius And.**
Rhinolophus solitarius Andersen, Ann. Mag. Nat. Hist. (7), XVI, 1905, p. 250: Banka.
Distr.—Banka Island.

Rhinolophus trifoliatus niasensis And.
Rhinolophus trifoliatus niasensis Andersen, Proc. U.S. Nat. Mus. XXIX, 1906, p. 658: Nias Island.
Distr.—Nias Island, West Sumatra.

Rhinolophus macrotis.

[**Rhinolophus macrotis macrotis Blyth.**
Rhinolophus macrotis Blyth, Journ. Asiat. Soc. Beng. XIII, 1844, p. 485: Nepal.
Distr.—Extralimital.]

Rhinolophus macrotis dohrni And.
Rhinolophus macrotis dohrni Andersen, Ann. Mus. Civ. Stor. Nat. Genova, III, 1907, p. 29: Deli, Sumatra.
Distr.—Sumatra.

Rhinolophus arcuatus.

[**Rhinolophus arcuatus arcuatus Peters.**
Rhinolophus arcuatus Peters, Mon. Ber. Akad. Berlin, 1871, p. 305: Luzon.
Distr.—Extralimital.]

Rhinolophus arcuatus beccarii And.
Rhinolophus arcuatus beccarii Andersen, Ann. Mus. Civ. Stor. Nat. Genova III, 1907, p. 477: Padang, Sumatra.
Distr.—Sumatra.

Rhinolophus creaghi Thos.[1]
Rhinolophus creaghi Thomas, Ann. Mag. Nat. Hist. (6), XVIII, 1896, p. 244: Sandakan, British North Borneo.
Distr.—Borneo.

* **Rhinolophus pilosus** And.
Rhinolophus pilosus Andersen, Ann. Mag. Nat. Hist. (9), II, 1918, p. 379: Madura.
Distr.—Madura.

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[1] *Rhinolophus creaghi, pilosus* and *canuti* may be subspecies.

Rhinolophus canuti Thos. and Wrought.
Rhinolophus canuti Thomas and Wroughton, Abstr. Proc. Zool. Soc. 1909, p. 18: South Java.
Distr.—Java.

Rhinolophus cœlophyllus Peters.
Rhinolophus coelophyllus Peters, Proc. Zool. Soc. 1866, p. 426, pl. XXXV: Burma.
Distr.—Malay States.

Genus HIPPOSIDEROS J. E. Gray, 1831.

Hipposideros armiger.[1] Horseshoe Bats.

[**Hipposideros armiger armiger (Hodgs.).**
Rhinolophus armiger Hodgson, Journ. Asiat. Soc. Beng. IV, 1835 (1836), p. 699: Nepal.
Distr.—Extralimital.]

Hipposideros armiger debilis And.
Hipposideros armiger debilis Andersen, Ann. Mag. Nat. Hist. (7), XVII, 1906, p. 37: Province Wellesley.
Distr.—Malay Peninsula.

Hipposideros pendleburyi Chas.
Hipposideros pendleburyi Chasen, Bull. Raffles Mus. 12, 1936, p. 133: Khao Ram, Nakon Sri Tamarat, Peninsular Siam.
Distr.—Peninsular Siam.

Hipposideros lylei Thos.
Hipposideros lylei Thomas, Ann. Mag. Nat. Hist. (8), XII, 1913, p 88: North Siam.
Distr.—Malay States.

Hipposideros diadema.[2]

Hipposideros diadema diadema (Geoff.).
Rhinolophus diadema E. Geoffroy, Ann. Mus. H. N. (Paris), XX, 1813, p 263: Timor.
Rhinolophus nobilis Horsf., Zool. Research. Java, 1824: Java (descr. and pls.).
Distr.—Java.

Hipposideros diadema vicarius And.
Hipposideros diadema vicarius Andersen, Ann. Mag. Nat. Hist. (7), XVI, 1905, p. 499: Sarawak.
Distr.—Malay Peninsula; Sumatra; Borneo.

Hipposideros diadema enganus And.
Hipposideros diadema enganus Andersen, Ann. Mus. Civ. Stor. Nat. Genova, III, 1907, p. 8: Engano.
Distr.—Engano Island, West Sumatra.

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[1] *Hipposideros armiger.* Revision; And., Ann. Mag. Nat. Hist. (7), XVII, 1906, p. 36.

[2] *Hipposideros diadema.* Revision: And., Ann. Mag. Nat. Hist. (7), XVI, 19[illegible]5, p. 497; *op. cit.* (9), II, 1918, p. 381.

Hipposideros diadema natunensis Chas.[1]

Hipposideros diadema natunensis Chasen, Bull. Raffles Mus. 15, 1940, p. 43: Bunguran Island.
Distr.—Bunguran Island, North Natuna Islands.

Hipposideros ridleyi Rob. and Kl.

Hipposideros ridleyi Robinson and Kloss, Journ. Fed. Malay States Mus. IV, 1911, p. 241: Singapore Island.
Distr.—Malay States (Singapore only).

Hipposideros dyacorum Thos.

Hipposideros dyacorum Thomas, Ann. Mag. Nat. Hist. (7) IX, 1902, p. 271: Mt. Mulu, Baram, Sarawak.
Distr.—Borneo.

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[1] **Hipposideros diadema natunensis** subsp. nov.

General characters as in *H. d. diadema* and *H. d. vicarius*, but much more brightly coloured; the nose leaves wider, and the anteorbital width relatively greater.

Type.—Young adult female (skin and skull), collected on Bunguran Island, North Natuna Islands, on 7th September, 1928 by F. N. Chasen. Raffles Mus. No. 663.

External measurements (in the flesh)—Total length, 144; tail, 48; forearm, 88; ear from crown, 23; ears, length by breadth, 28 by 23; lower leg including claw, 48·8; tibia, 33·5; breadth of posterior nose-leaf, 14 mm.

Skull.—Total length (to front of canine), 32·2; anteorbital width, 9·8; zygomatic width, 19; upper teeth, 13·5 mm.

Colour.—Pattern as in *diadema* and *vicarius*, but the pale areas yellowish buff, and the dark areas ochraceous-tawny. In life the general colour impression of the fur was dull orange.

Remarks.—Only one specimen of this handsome bat was obtained; it was hanging to the underside of a large leaf in the forest. I have seen many scores of bats of this species from limestone caves in Borneo and the Malay States, but never one resembling *natunensis* in colour: all conformed to the colours described by Andersen in Ann. Mag. Nat. Hist. (7), XVI, 1905, p. 303. I find the anteorbital width of series of *diadema* and *vicarius* about as given by Andersen: in skulls of either race measuring about 32·2 mm. in length, the anteorbital breadth is about 9·3 mm. or less, against 9·8 in *natunensis*. With a forearm of at least 88 mm. in length the type, with unworn teeth, is larger than any of a very large series of *vicarius* although *diadema*, a slightly larger race, according to Andersen attains a maximum of 91 mm., and *natunensis* is, therefore, almost certainly a larger subspecies than its nearest allies.

Hipposideros sabanus Thos.

Hipposideros sabanus Thomas, Ann. Mag. Nat. Hist. (7), I, 1898, p. 243: Lawas, Sarawak.
Distr.—Borneo.

Hipposideros cineraceus Blyth.

Hipposideros cineraceus Blyth, Journ. Asiat. Soc. Beng. XXII, 1853, p. 410: Punjab.
Distr.—Malay Peninsula; Rhio Archipelago; Anamba Islands; Borneo.

Hipposideros bicolor (Temm.).[1]

Rhinolophus bicolor Temminck, Tijdschr. nat. geschied. physiol. I (i), 1834, p. 19: Java.
Distr.—Peninsular Siam; Sumatra; Java.

In the Raffles Museum a fair series of *cineraceus* is from the Rhio Archipelago; various Malay States; small islands in the Straits of Malacca; the larger islands of Terutau and Langkawi; northwards to Raheng in West Siam; and from the Anamba Islands in the South China Sea. These form a very even series. Some from Perak have the posterior erect nose-leaf conspicuously narrow which puzzled me at first, but the specimens are very hard and I now think that the heads are much shrunken by immersion in strong alcohol. The average length of the forearm is highest on Pulau Pisang, a small island off the west coast of Johore (36–37·3 mm.), but 34–36·5 mm. is the range for the remainder of the series.

From Peninsular Siam (from about the latitude of Trang northwards) and from Condore Island, Cochinchina, I have a slightly larger form (forearm, 38–40 mm.), *H. bicolor,* and it is curious that this has not yet turned up in the south of the Malay Peninsula. Specimens of *H. gentilis atrox* are from the Malay States, and the island of Terutau. No other member of this *Hipposideros* "*bicolor*" group is represented in the Singapore collection.

From Java I have seen a well-prepared skin of a bat, but with shrivelled nose-leaves, in the collection of Dr. Max Bartels, that appears to belong to *gentilis* (sens. lat.). It came from the exact type locality of *javanicus.* It has a forearm of 48·4 mm. according to the careful measurements of the collector, but I cannot verify this in the skin as the ends of the bones have been clipped off. This bat agrees fairly well with the description of *javanicus,* but the identification cannot be regarded as absolutely certain as no important diagnostic character is mentioned in the original description. Sody later recorded it from Banka.

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[1] *Hipposideros bicolor and allied forms.* Revision: Andersen, Ann. Mag. Nat. Hist. (9) II, 1918, p. 379.

Hipposideros gentilis.

[**Hipposideros gentilis gentilis** And.
Hipposideros gentilis Andersen, Ann. Mag. Nat. Hist. (9), ii, 1918, p. 380: Thayetmyo, Burma.
Distr.—Extralimital.]

Hipposideros gentilis atrox And.
Hipposideros gentilis atrox Andersen, Ann. Mag. Nat. Hist. (9), ii, 1918, p. 380: Semangko Pass, Selangor-Pahang Boundary, Malay States, 2,800 ft.
Distr.—Malay Peninsula.

Hipposideros gentilis major And.
Hipposideros gentilis major Andersen, Ann. Mag. Nat. Hist. (9), ii, 1918, p. 380: Engano Island.
Distr.—Nias and Engano Islands, West Sumatra.

Hipposideros gentilis javanicus Sody.
Hipposideros javanicus Sody, Temminckia, II, 1937, p. 215: Tjilatjap, Central Java.
Distr.—Java; Banka.

Hipposideros nequam And.
Hipposideros nequam Andersen, Ann. Mag. Nat. Hist. (9), II, 1918, p. 380: Selangor, Malay States.
Distr.—Malay States.

* **Hipposideros doriæ** (Peters).
Phyllorhina doriae Peters, Mon. Ber. Akad. Berlin, 1871, p. 326: Sarawak.
Distr.—Borneo.

Hipposideros larvatus.[1]

Hipposideros larvatus larvatus (Horsf.).
Rhinolophus larvatus Horsfield, Zool. Researches Java, 1823: Java.
Rhinolophus vulgaris, deformis et insignis Horsf., Zool. Researches Java, 1823: Java.
Distr.—Java.

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[1] *Hipposideros larvatus.* A large series of specimens from caves in North Sumatra gives a forearm range of 56·5–63·5 mm·, but the extremes are rare and in the great majority of specimens the forearm measures 58–60 mm. which is also the size of average specimens from the Malay States. This is slightly larger than Javan topotypes of *larvatus* and I therefore use Sody's name for a non-Javanese Malaysian race. In the west and north of Siam the average is still higher, about 62 mm. but it drops again in Pulau Condore, and apparently in other parts of French Indo-China which may therefore be inhabited by *H. l. larvatus*. *See* also G. M. Allen, Rec. Ind. Mus. XXXVIII, 1936 (Sept.), p. 345.

***Hipposideros larvatus barbensis Mill.**
Hipposideros barbensis Miller, Proc. Wash. Acad. Sci., II, 1900, p. 234: St. Barbe Island.
Distr.—St. Barbe Island, South China Sea.

Hipposideros larvatus neglectus Sody.
Hipposideros larvatus neglectus Sody, Natuur. Tijdschr. Ned. Ind. XCVI, 1936, p. 46: Mt. Kenepai, Dutch Central Borneo.
Distr.—Malay Peninsula; Tioman Island; Sumatra; Nias Island; Borneo; Karimata Islands; Sirhassen Island, South Natuna Islands.

***Hipposideros coxi Shelf.**
Hipposiderus coxi Shelford, Ann. Mag. Nat. Hist. (7), VIII, 1901, p. 113: Mt. Penrisen, Sarawak, 4.200 ft.
Distr.—Borneo.

Hipposideros longicauda.[1]

Hipposideros longicauda longicauda (Ptrs.).
Phyllorhina longicauda Peters, Mon. Ber. Akad. Berlin, 1861, p. 708: Java.
Distr.—Java.

Hipposideros longicauda insolens Lyon.
Hipposideros insolens Lyon, Proc. U. S. Nat. Mus. XL, 1911, p. 129: Upper Pasir River, South-East Borneo.
Distr.—Borneo.

Hipposideros galeritus.

Hipposideros galeritus galeritus Cant.
Hipposideros galeritus Cantor, Journ. Asiat. Soc. Beng. 1846, p. 183: Penang.
Distr.—Malay States; Banka; South Natuna Islands; Rhio Archipelago.

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[1] It is long time since I saw the type of *galeritus*, and I have never seen topotypes of *schneideri:* my arrangement of this group is therefore weak. In Borneo, *labuanensis* and *insolens* occur side by side, and the latter seems more like *longicauda* than *galeritus* or *labuanensis*. My standard of "*galeritus*" is a pair from Pahang (female and male). The measurements are: forearm, 49·2, 49·6; tibia, 19·5, 19·5; tail, 25, 26; skull to front of canine 18.9, 18·6 mm. In the male there are very small upper anterior premolars: in the female I cannot detect these teeth. From these Malayan animals only a very slightly higher average length of the forearm distinguishes Banka specimens. *Labuanensis* averages smaller than *galeritus*, but the difference is very slight.

Hipposideros galeritus labuanensis (Tomes).

Phyllorhina labuanensis Tomes, Proc. Zool. Soc. 1858, p. 538: Labuan Island, Borneo.

Distr.—Borneo.

* **Hipposideros galeritus schneideri** Thos.

Hipposideros schneidersi (misprint) Thomas, Zool. Anzeiger, XXVII, 1904, p. 722: Upper Langkat, Sumatra.

Distr.—Sumatra; ? Engano Island.

* **Hipposideros speoris.**[1]

Hipposideros speoris speoris (Schneid.).

Vespertilio speoris Schneider, Beschr. Fledermaus Ostindien, Frankf. (no date, ? *c.* 1817); pl. 59B. in Schreber's Säugth. 1800: Timor. *References from Sherborn.*

Distr.—Borneo; Java.

Genus ASELLIA J. E. Gray, 1838.

Asellia stoliczkana Dobs. Trident Horseshoe Bat.

Asellia stoliczkana Dobson, Proc. Asiat. Soc. Beng. 1871, p. 106: Penang.

Distr.—Malay States.

Genus CŒLOPS[2] Blyth, 1848.

Cœlops robinsoni Bonh. Tail-less Horseshoe Bats.

Coelops robinsoni Bonhote, Journ. Fed. Malay States Mus. iii, 1908, p. 4: foot of Mt. Tahan, Pahang, Malay States.

Distr.—Malay Peninsula.

Cœlops frithii Blyth.

Coelops frithii Blyth, Journ. Asiat. Soc. Bengal, XVII, 1848, p. 251: Bengal.

Coelops bernsteinii Peters, Wiegm. Archiv. II, 1862, p. 117: Java (*non vid.*).

Distr.—Java.

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[1] *Hipposideros speoris.* None of the purely Malaysian records of this bat seems above suspicion. I have never examined a local specimen.

[2] The described forms of *Coelops* are all so much alike that they could well be subspecies of the same species but so few specimens are known that, for the present, I have left the names as they stand, accepting the current view that *frithii* and *bernsteinii* are inseparable. *Robinsoni* is known from four specimens (Pahang, Terutau Island and Peninsular Siam); the forearms measure 37–41·3 mm. Javan animals have forearms 41–42 mm. in length which is, according to the available scanty information, about the same as in *frithii* of Bengal. The only direct comparison I have been able to make in this genus is between *skins* from Assam and Java, and these are certainly much alike.

Genus CHILOPHYLLA Miller, 1910.[1]

*** Chilophylla hirsuta Mill.**

Chilophylla hirsuta Miller, Proc. U. S. Nat. Mus. XXXVIII, 1910, p. 395, pl. 18: Philippine Islands.

Distr.—Malay States (Port Swettenham only).

Family VESPERTILIONIDÆ.

Genus MYOTIS Kaup, 1829.

Myotis horsfieldii.[2] Mouse-eared Bats.

Myotis horsfieldii horsfieldii (Temm.).

Vespertilio horsfieldii Temminck, Mon. Mamm. II, 1840, p. 226: Java.

Distr.—Malay States; Java; Bali.

Myotis horsfieldii carimatæ (Mill.).

Myotis carimatae Miller, Proc. U. S. Nat. Mus. XXXI, 1906, p. 62: Karimata Island.

Distr.—Karimata Island; Borneo; Mendanau Island; Sumatra.

Myotis lepidus (Thos.).

Leuconoe lepidus Thomas, Ann. Mag. Nat. Hist. (8), XV, 1915, p. 171: Baram, Sarawak.

Distr.—Borneo.

Myotis adversus (Horsf.).[3]

Vespertilio adversus Horsfield, Zool. Researches Java, 1824: Java.

Distr.—Malay States; South Natuna Islands; Java.

Myotis hasseltii (Temm.).

Vespertilio hasseltii Temminck, Mon. Mamm. II, 1840, p. 225: Java.

Distr.—Malay States; Sumatra; Rhio Archipelago; Java.

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[1] *Chilophylla.* This genus seems extremely close to *Coelops*, but in the absence of a specimen I have accepted it here.

[2] *Myotis horsfieldii.* Specimens from Borneo and the Karimata Islands have larger skulls than the few topotypes of *horsfieldii* available for comparison. Lyon (1908) also refers specimens from East Sumatra to *carimatae*. Curiously enough, Malayan specimens seem nearest to *h. horsfieldii*, but a longer series might be separable as a third race. But what is *Vespertilio macellus* Temm., Mon. Mamm. 1840, p. 230: Borneo? The colour description fits *horsfieldii*, and the name may therefore replace one of those used above.

[3] *Myotis* spp. I cannot trace any records of *adversus* from Borneo and Sumatra; or *hasseltii* from Borneo, which seem based on a critical examination of the specimens.

Myotis muricola.[1]

Myotis muricola muricola (Hodgs.).

Vespertilio muricola Hodgson, in Gray, Cat. Mamm. Nepal etc. 1846, p. 4: Nepal.

Distr.—Malay Peninsula; Sumatra; Sipora Island; Borneo; Java; Bali.

* **Myotis muricola abbotti Lyon.**

Myotis abbotti Lyon, Proc. U. S. Nat. Mus. LII, 1916, p. 441: North Pagi Island.

Distr.—Pagi Islands, West Sumatra.

* **Myotis muricola niasensis Lyon.**

Myotis niasensis Lyon, Proc. U.S. Nat. Mus. LII, 1916, p. 441: Nias Island.

Distr.—Nias Island, West Sumatra.

* **Myotis bartelsii (Jent.).**

Chrysopteron bartelsii Jentink, Notes Leyd. Mus. XXXII, 1910, p. 74: Mt. Panerango, Java, 10,000 ft.

Distr.—Java.

* **Myotis hermani** Thos.

Myotis hermani Thomas, Ann. Mag. Nat. Hist. (9), XI, 1923, p. 252: Sabang, North-West Sumatra.

Distr.—Sumatra.

* **Myotis oreias**[2] (Temm.).

Vespertilio oreias Temminck, Mon. Mamm. II, 1840, p. 270: Singapore.

Distr.—Malay States.

Myotis peytoni.

[**Myotis peytoni peytoni Wrought. and Ryl.**

Myotis peytoni Wroughton and Ryley, Journ. Bomb. Nat. Hist. Soc. XXII, 1913, p. 13: Kanara.

Distr.—Extralimital.]

Myotis peytoni federatus Thos.

Myotis peytoni federatus Thomas, Journ. Fed. Mal. States Mus. VII, 1916, p. 3: Semangko Pass, Malay States, 2,700 ft.

Distr.—Malay States.

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[1] *Myotis muricola.* Good series from the Malay States have a forearm range of 32·6–36·5 mm. In North Sumatra and East Borneo the average is about the same, but is unsteady in other parts of Malaysia, and in South Sumatra it is higher (35·5–38·7 mm.) than in the north: according to my specimens it drops again in Java, and rises in North Borneo. A Nias race is said to be small, and a Pagi Island race, large, but in view of the above facts I feel a little doubtful about the necessity of recognizing more than one Malaysian race. The pelage tends to be longer and thicker in specimens from high levels.

[2] *Myotis emarginatus* (Geoff.), has been recorded from Peninsular Siam (Bonhote, 1900), but although I have not seen the specimen I feel at liberty to doubt the identification.

Genus PIPISTRELLUS Kaup, 1829.

* **Pipistrellus mordax** (Ptrs.).[1] Pipistrelles.
Vesperugo mordax Peters, Mon. Ber. Akad. Berl. 1866, p. 402: Java.
Distr.—Java.

* **Pipistrellus annectens** Dobs.[2]
Pipistrellus annectens Dobson, Proc. Asiat. Soc. Beng. 1871, p. 213: Naga Hills, Assam.
Distr.—Sumatra.

Pipistrellus brachypterus (Temm.)[3]
Vespertilio brachypterus Temminck, Mon. Mamm. II, 1840, p. 215, pl. 53: Sumatra.
Distr.—Sumatra; Java; ? Banka.

Pipistrellus circumdatus (Temm.).
Vespertilio circumdatus Temminck, Mon. Mamm. II, 1840, p. 214: Java.
Distr.—Java.

Pipistrellus imbricatus.

Pipistrellus imbricatus imbricatus (Horsf.).
Vespertilio imbricatus Horsfield, Zool. Researches Java, 1824: Java.
Distr.—Java; Kangean Island; Bali.

Pipistrellus imbricatus macrotis (Temm.).
Vespertilio macrotis Temminck, Mon. Mamm. 1840, p. 218: Padang, Sumatra.
Pipistrellus vordermanni Jent., Notes Leyd. Mus. XII, 1890, p. 152: Billiton.
Pipistrellus curtatus Mill., Proc. Biol. Soc. Wash. XXIV, 1911, p. 25: Engano.
Distr.—Malay States; Sumatra; Billiton; Nias; Engano.

Pipistrellus inbricatus kitcheneri Thos.
Pipistrellus kitcheneri Thomas, Ann. Mag. Nat. Hist. (8), XV, 1916, p. 229: Barito River, South-Central Borneo.
Distr.—Borneo.

Pipistrellus tenuis (Temm.)[4]
Vespertilio tenuis Temminck, Mon. Mamm. II, 1840, p. 229: Java.
Distr.—Malay Peninsula; Sumatra; Borneo; Java.

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[1] *Pipistrellus mordax.* *See* Sody, Temminckia, II, 1937, p. 215. Could perhaps be regarded as a subspecies of *savii* (Italy).

[2] *Pipistrellus annectens.* No specimen seen. Given on the faith of Schneider (Zool. Jahr., Jena, 1905, p. 80).

[3] *Pipistrellus brachypterus.* Java (Coll. Bartels), specimen examined but no direct comparison possible.

[4] *Pipistrellus tenuis.* All records taken from literature: no specimen in Singapore.

Pipistrellus tralatitius.[1]

Pipistrellus tralatitius tralatitius (Horsf.).

Vespertilio tralatitius Horsfield, Zool. Researches Java, 1824: Java.

Scotophilus javanicus Gray, Mag. Zool. Bot. II, 1838, p. 498: Java (*non vid*).

Pipistrellus tralatitius bancanus Sody, Temminckia, II, 1937, p. 233: Banka.

Distr.—Malay Peninsula; Sumatra; Banka; Borneo; Java.

Pipistrellus tralatitius subulidens Mill.[2]

Pipistrellus subulidens Miller, Proc. Wash. Acad. Sci. III, 1901, p. 134: Sirhassen Island.

Distr.—Sirhassen Island, South Natuna Islands.

Pipistrellus murrayi Andrs.

Pipistrellus murrayi Andrews, Mongr. Christmas Island, 1900, p. 26: Christmas Island.

XL *Distr.*—Christmas Island, Indian Ocean; ? Cocos-Keeling Islands (*sp. incert.*).

Pipistrellus ridleyi Thos.

Pipistrellus ridleyi Thomas, Ann. Mag. Nat. Hist. (7), I, 1898, p. 361: Selangor.

Distr.—Malay States.

Genus GLISCHROPUS Dobson, 1875.

Glischropus tylopus (Dobs.). Thick-thumbed Pipistrelles.

Vesperugo tylopus Dobson, Proc. Zool. Soc. 1875, p. 473: North Borneo.

Distr.—Malay Peninsula; Sumatra; Borneo.

Glischropus javanus Chas.

Glischropus javanus Chasen, Treubia, XVII, 1939, p. 189: Mt. Pangrango, West Java.

Distr.—Java.

Genus TYLONYCTERIS Peters, 1872.

Tylonycteris pachypus (Temm.). Club-footed Bats.

Vespertilio pachypus Temminck, Mon. Mamm. II, 1840, p. 217: Bantam, West Java.

Distr.—Malay States; Borneo; Java.

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[1] *Pipistrellus tralatitius.* I cannot see that Banka specimens with forearms, 31–34 mm. differ in any way from various Javan series before me: only in a large series from Garoet is the average higher. I find a similar unsteadiness in Sumatran series.

[2] *P. t. subulidens.* Erratum: Bull. Raff. Mus. 10, 1935, p. 28; for 43·9, 43·6 mm. read 33·9, 33·6 mm.

Tylonycteris robustula Thos.

Tylonycteris robustula Thomas, Ann. Mag. Nat. Hist. (8), XV, 1915, p. 227: Upper Sarawak.
Distr.—Malay Peninsula; Sumatra; Borneo; Java; Bali.

Tylonycteris malayana Chas.[1]

Tylonycteris malayana Chasen, Bull. Raff. Mus. 15, 1940, p. 52: Jor, Batang Padang, Perak, Malay States.
Distr.—Malay States.

Genus HESPEROPTENUS Peters, 1868.

* **Hesperoptenus doriæ** (Petrs.). False Serotine Bats.

Vesperus (Hesperoptenus) doriae Peters, Mon. Ber. Akad. Berl. 1868, p. 626: Sarawak.
Distr.—Borneo.

Hesperoptenus blanfordi (Dobs.).

Vesperugo (Hesperoptenus) blanfordi Dobson, Journ. Asiat. Soc. Beng. XLVI, pt. II, 1877, p. 312: Tenasserim.
Distr.—Malay Peninsula.

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[1] *Tylonycteris.* I have not yet seen an example of the tiny true *pachypus* from Sumatra, although no doubt the species occurs on that island for it lives side by side with *robustula* in Borneo, Java and the Malay States. In the Malay States there is a third form of this genus which is not the smaller *fulvida* Blyth (Burma).

Tylonycteris malayana sp. nov.

Type.—Adult female (skin and skull), collected at Jor, Batang Padang district, Perak, Malay States, in June 1923, by F. N. Chasen, Raffles Mus. No. 240.

Characters.—Detailed characters as in *T. robustula* of which large series are available for comparison, but larger and heavier. Colour, on long series, as in *robustula*, but under parts darker.

Skull.—Larger, and especially broader and flatter than in *robustula.*

Measurements of the type.—Total length, 70; tail, 33 (from anus); lower leg. (c.u.), 18·5; ear, 7 from crown; breadth of ear at base, 7 mm. *Skull.*—greatest length, 13·5; median length, 10·7; condyle to front of canine 12·7; breadth of braincase, 8; front of canine to back of m^3, 4·5; zygomatic width, 10 mm.

Remarks.—Although it is not easy to define, on account of the overlap in some of the measurements with series of *robustula* (specimens from Singapore compared), this new form is certainly distinct, and side by side series of the two forms look very different. The following measurements seem not to overlap, those of *malayana* being given first—Forearm, over 28·5, under 28; lower leg (c.u.), over 18·5, under 17·5; breadth of adhesive

Hesperoptenus tomesi Thos.
Hesperoptenus tomesi Thomas, Ann. Mag. Nat. Hist. (7) XVI, p. 575: Malacca.
Distr.—Malay States.

Genus **NYCTALUS** Bowdich, 1825.

Nyctalus stenopterus (Dobs.). Noctule Bats.
Vesperugo stenopterus Dobson, Proc. Zool. Soc. 1873, p. 470: Sarawak.
Distr.—Malay Peninsula; Rhio Archipelago; Sumatra; Borneo.

Nyctalus noctula.[1]

[**Nyctalus noctula noctula** (Schreb.).
Vespertilio noctula Schreber, Säugth. I, 1774, p. 166, pl. lii: France.
Distr.—Extralimital.]

Nyctalus noctula labiatus (Hodgs.).
Vespertilio labiata Hodgson, Journ. Asiat. Soc. Beng. IV, 1835 (1836), p. 700: Nepal.
Distr.—Malay States.

Genus **EPTESICUS** Rafinesque, 1820.

Eptesicus verecundus Chas.[2] Serotine Bats.
Eptesicus verecundus Chasen, Bull. Raffles Mus. 15, 1940, p. 53: Perak.
Distr.—Malay States.

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pads on feet, over 4, less than 4 mm. *Skull.*—breadth of braincase, 7·5–8, 6·7–7·2; zygomatic breadth, max. 10, 9·5 mm. There is a slight overlap in the greatest length of the skull, 13–14, 12·5–13·3 mm.

[1] *Nyctalus noctula.* No Malaysian specimen examined and *labiatus* used entirely on geographic grounds. The localities "Sumatra" and "Java" of various authors need confirmation.

[2] **Eptesicus verecundus** sp. nov.

Type.—Female in alcohol, collected on Mt. Kledang, Perak, Malay States, 2646 feet, in November, 1916 by Dr. R. Hanitsch, Raffles Museum, No. 199.

General characters as in *E. pachyotis* Dobson, and *E. demissus* Thos. but smaller than both: wings to the ankles, or to the metatarsus just below the ankle.

Compared with *pachyotis* the body is larger in relation to the wings, as in *demissus*. Ears as in *pachyotis* with the same thickened lower edge. Tragus curved inwards, very short and rounded, the free inner edge slightly less than the greatest breadth. A distinct post-calcarial lobe.

Inner incisor much the larger, and tricuspid. Upper canines with a small posterior secondary cusp.

Eptesicus demissus Thos.
Eptesicus demissus Thomas, Journ. Fed. Malay States Mus., VII, 1916, p. 1: Bandon, Peninsular Siam.
Distr.—Peninsular Siam.

Genus **SCOTOPHILUS** Leach, 1821.[1]

Scotophilus kuhli Leach. Brown Bats.
Scotophilus kuhli Leach, Trans. Linn. Soc. XIII, 1821, p. 71: ? India.
Distr.—Peninsular Siam.

Scotophilus temminckii Leach.
Scotophilus temminckii temminckii (Horsf.).
Vespertilio temminckii Horsfield, Zool. Researches Java, 1824: Java, *restr.* West Java, *Sody,* 1936.
Scotophilus temmincki collinus Sody, Natuur. Tijdschr. Ned. Ind. XCVI, 1936, p. 48: Bali.
Scotophilus castaneus solutatus Sody, *tom. cit.* p. 49: East Java.
Distr.—Java; Bali.

Fur dark brown above, paler on the underparts (dried from alcohol).

Dimensions.—Forearm, 34·5 (35); head and body, 56 (57); tail, 34 (34); lower leg and hind-foot with claws, 21·5 (21) mm.

Skulls.—Condyle to front of canine, 14·2 (14); basi-sinual length, 11·3 (10·8); front of canine to back of m^3, 4·8 (4·9) mm.

The measurements in brackets are those of a second example, also a female, from an unspecified locality in Perak.

Specimens of *E. pachyotis* from the Khasia Hills, Assam, very kindly sent to Singapore from the Indian Museum, Calcutta as the types of *pachyotis* some years ago, have the following measurements:—♂, ♀ forearm 41, 41; lower leg and hind-foot with claws 24·5, 25mm. Unfortunately the skulls have not been extracted.

[1] *Scotophilus.* In many parts of Siam *S. kuhli* (forearm about 60 mm.) and *castaneus* occur side by side. In the Malay Peninsula the latter is a very common bat. The largest example I have ever seen has a forearm of 53·5 mm. but this is exceptionally long and 50 mm. and even less is a commoner measurement. The skulls are more variable in size than those of most other species of bats. I have never seen *kuhli* from the Malay Peninsula, but can accept Bonhote's 1900 record from as far south as Patani, because from his remarks it is clear that this author knew the differences between the two species. From Sumatra I can trace no really reliable record of the genus, although *castaneus* must surely occur on the island. From Borneo there is little precise information and vague records of "*temmincki*" are here referred to *castaneus* purely on zoogeographic grounds: no specimens from Borneo have been examined. My treatment of the situation in Java is, I fear, rather drastic, but I am not yet convinced that more than one very variable form (averaging larger than *castaneus*) is found in that island. *See* also Sody, Natuur. Tijds. Ned. Ind. LXXXVIII, 1928 for a partial revision.

Scotophilus temminckii castaneus Gray.
Scotophilus castaneus J. E. Gray, Mag. Zool. Bot. II, 1838, p. 498: Malacca.
Distr.—Malay Peninsula; Rhio Archipelago; Borneo.

Genus MURINA J. E. Gray, 1842[1]

Murina suilla (Temm.). Tube-nosed Bats.
Vespertilio suillus Temminck, Mon. Mamm. II, 1840, p. 224: Java.
Distr.—Malay States; Sumatra; Borneo; Java.

Murina balstoni Thos.
Murina balstoni Thomas, Ann. Mag. Nat. Hist. (8), II, 1908, p. 370: Tasimalaja, Preanger, Java.
Distr.—Java.

*** Murina canescens Thos.**
Murina canescens Thomas, Ann. Mag. Nat. Hist. (9), XI, 1923, p. 254: Nias Island.
Distr.—Nias Island, West Sumatra.

Genus HARPIOCEPHALUS J. E. Gray, 1842.

Harpiocephalus harpia. Hairy-winged Bat.

Harpiocephalus harpia harpia (Temm.).
Vespertilio harpia Temminck, Mon. Mamm. II, 1840, p. 219: Java.
Harpiocephalus rufus Gray, Ann. Mag. Nat. Hist. X, 1842, p. 259: nom. nov. for *harpia*.
Distr.—Sumatra; Java.

Genus KERIVOULA J. E. Gray, 1842.

Kerivoula papillosa. Forest Bats.

Kerivoula papillosa papillosa (Temm.).
Vespertilio papillosa Temminck, Mon. Mamm. II, 1840, p. 220: Bantam, Java.
Distr.—Java.

Kerivoula papillosa malayana Chas.[2]
Kerivoula papillosa malayana Chasen, Bull. Raff. Mus. 15, 1940, p. 55: Malay States.
Distr.—Malay States; Sumatra; Borneo.

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[1] The tube-nosed bats are all rare, or difficult to collect, in Malaysia. A single example of "*suillus*" from the Malay States is only tentatively referred to this species.

[2] **Kerivoula papillosa malayana** subsp. nov.

Like *K. p. papillosa* of Java, but the skull larger.

Type.—Adult female (in alcohol), with the skull extracted, collected at Ginting Bidai, on the Selangor—Pahang boundary, Malay States, 2,300 ft., in September, 1914. Raffles Mus. No. 6348.

Kerivoula hardwickii.

Kerivoula hardwickii hardwickii (Horsf.).

Vespertilio hardwickii Horsfield, Zool. Researches Java, 1824: Java.

Kerivoula fusca Dobson, Proc. Asiat. Soc. Beng. 1871, p. 215: no locality = Java.

Distr.—Malay States; Borneo; Java; Bali; Kangean Island.

Kerivoula hardwickii engana Mill.

Kerivoula engana Miller, Proc. U.S. Nat. Mus. XXX, 1906, p. 825: Engano Island.

Distr.—Mentawi Islands (Sipora and Siberut); Engano, West Sumatra.

Kerivoula picta.[1] Painted Bat.

Kerivoula picta picta (Pall.).

Vespertilio pictus Pallas, Spic. Zool. III, 1767, p. 7: Peninsular India.

Distr.—Malay States; Sumatra; Borneo; Java; Bali.

Kerivoula pusilla.

Kerivoula pusilla pusilla Thos.

Kerivoula pusilla Thomas, Ann. Mag. Nat. Hist. (6), XIV, 1894, p. 461: Mt. Mulu, Sarawak.

Distr.—Borneo.

External measurements (in the flesh).—Head and body, 52; tail, 52; forearm, 43·4; lower leg and hindfoot, c.u. 30·6 mm.

Colour.—Upper parts, pale dull brown to greyish fawn, the crown and back darker, the muzzle, mantle and sides of the body paler; fur greyish at base. Under parts, slightly paler and yellower, the fur more extensively grey at the base except on the throat (dried from alcohol).

Skull.—Total length (incisive), 18·2; length to canine 18·3; mastoid width, 8·7; braincase, 8·4; zygomatic width, 11·4 (*c.*); m^3 to canine, 7·6 mm.

Remarks.—Four Malayan specimens have the forearms measuring 40·7 to 43·2 mm. Two from Sarawak measure 43–43·4; they have large skulls (maximum total length, 18·4 mm.) and should be placed with *malayana*. Adults from Java have the skull about 17 mm. in greatest length, and sometimes slightly less. The few skins seen from Java are also rather greyer than in *malayana*. *K. lenis* Thos. (Calcutta), is rather smaller than *papillosa*.

I have no specimens from Sumatra, and have assumed that they are *malayana*.

[1] *Kerivoula picta*. A few Javan specimens have a forearm range of 32.2–37; four from Siam measure 32.7–34; and one from Annam, 36 mm. I have not seen the original reference and cannot therefore check the type locality, which I have seen quoted as "Java".

Kerivoula pusilla minuta Mill.[1]
Kerivoula minuta Miller, Proc. Acad. Nat. Sci. Phil. 1898, p. 321: Trang, Peninsular Siam.
Distr.—Malay Peninsula.

* **Kerivoula bicolor Thos.**
Kerivoula bicolor Thomas, Ann. Mag. Nat. Hist. (7), XIV, 1904, p. 199: Biserat, Jalor, Peninsular Siam.
Distr.—Peninsular Siam.

Kerivoula bombifrons Lyon.[2]
Kerivoula bombifrons Lyon, Proc. U.S. Nat. Mus. XL, 1911, p. 135: Matan River, Dutch West Borneo.
Distr.—Borneo; Java.

* **Kerivoula pellucida (Waterh.).**
Vespertilio pellucidus Waterhouse, Proc. Zool. Soc. 1845, p. 6: Philippine Islands.
Distr.—Sumatra.

Genus **PHONISCUS** Miller, 1905.

Phoniscus atrox Mill. Groove-toothed Bats.
Phoniscus atrox Miller, Proc. Biol. Soc. Wash. XVIII, 1905, p. 229: Kateman River, East Sumatra.
Distr.—Peninsular Siam; Sumatra.

Phoniscus javanus (Thos.).
Kerivoula javana Thomas, Ann. Mag. Nat. Hist. (5), V, 1880, p. 272: Java.
Distr.—Java.

Genus **MINIOPTERUS** Bonaparte, 1837.

Miniopterus fuliginosus. Long-fingered Bats.

[**Miniopterus fuliginosus fuliginosus (Hodgs.).**
Vespertilio fuliginosus Hodgson, Journ. Asiat. Soc. Beng. IV, 1835 (1836), p. 700: Nepal.
Distr.—Extralimital.]

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[1] *Kerivoula p. minuta.* South to Jor, Perak, Malay States.

[2] *K. pellucida*, a Philippine species, has been recorded from Sumatra. I have not seen the specimens (in the Leyden Mus.): maybe they are *bombifrons.* *See* Jent., Notes Leyd. Mus. XIII, p. 204. I also refer to *bombifrons*, but without direct comparison, an old specimen collected many years ago in Java (Bartels coll.). It is much discoloured, but I doubt if it was ever grey. It is now pale cinnamon-buff, almost white on the centre of the underparts: the anterior part of the braincase is much swollen; forearm, 31·5 mm.

Miniopterus fuliginosus blepotis (Temm.).[1]
Vespertilio blepotis Temminck, Mon. Mamm. II, 1840, p. 212: Java.
Distr.—Sumatra; Borneo; Java.

* **Miniopterus ravus** Sody.
Miniopterus ravus Sody, Natuur. Tijdschr. Ned. Ind. XC, 1930, p. 271: Central Java.
Distr.—Java.

Miniopterus medius Thos. and Wrought.
Miniopterus medius Thomas and Wroughton, Kaliputjang, West Java.
Distr.—Malay Peninsula; Anamba Islands; Borneo; Java.

Miniopterus witkampi Sody.
Miniopterus witkampi Sody, Natuur. Tijdschr. Ned. Ind. XC, 1930, p. 272: East Borneo.
Distr.—Borneo.

Miniopterus tibialis Tomes.
Miniopterus tibialis Tomes, Proc. Zool. Soc. 1858, p. 126: Amboina.
Distr.—Java; Borneo.

Family MOLOSSIDÆ.

Genus **CHÆREPHON** Dobson, 1874 ("Chœrephon").[2]

Chærephon plicatus.[3] Wrinkled-lipped Bat.

Chærephon plicatus plicatus (Buch.).
Vespertilio plicatus F. Buchannan, Trans. Linn. Soc. V, 1800, p. 261, pl. 13: Bengal.
Distr.—Malay States; Sumatra; Borneo.

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[1] *Miniopterus f. blepotis.* Specimens from all quoted localities are in Raffles Mus. It also occurs in Siam as far north as Bangkok, but there is no record for the Malay Peninsula. I have never seen *ravus* which, according to its describer, presents a most curious combination of characters, a very large skull and relatively short forearm. Although Sody has recorded both *medius* and *witkampi* from Borneo, it seems possible that the latter name really covers a Bornean form of *medius*, characterized by smaller size. The specimens from the Anamba Islands recorded above as *medius* are really intermediate between that form and *witkampi*.

[2] *Chaerephon.* Generic revision: Thos., Jour. Bomb. Nat. Hist. Soc. XXII, 1913, p. 90.

[3] *C. plicatus.* Sody (*l.c.s.*) contends that there are three forms of this bat in Java, and he has found, or provided names for them all. My appreciation of the situation is that there is a large form in the west (forearms, 43 to 50 mm. but the minimum rare and a fair average about 47·5 mm.) and a smaller, more brightly coloured form in Mid and East Java (forearms 40–45, 43 mm. av.). I have good series of the western form from Wijnkoops Bay on the south coast. Although alike in size, the west

Chærephon plicatus dilatatus (Horsf.).

Nyctinomus dilatatus Horsfield, Zool. Researches Java, 1822: Java, *restr.* West Java.

Distr.—Java (west).

Chærephon plicatus tenuis (Horsf.).

Nyctinomus tenuis Horsfield, Zool. Researches Java, 1822: Proewoto, Mid-Java.

Choerephon plicatus adustus Sody, Natuurk. Tijdschr. Ned. Ind. XCVI, 1936, p. 50: Pangandaran, South-Central Java.

Distr.—Java (Mid and East).

Chærephon johorensis (Dobs.).

Molossus (*Nyctinomus*) *johorensis* Dobson, Proc. Asiat. Soc. Beng. 1873, p. 22: Johore.

Distr.—Malay States (Johore; Selangor); island of Sri Buat off east Johore coast; Sumatra.

Genus OTOMOPS Thomas, 1913.

Otomops formosus Chas.

Otomops formosus Chasen, Treubia, XVII, 1939, p. 186: Tjibadak, West Java.

Distr.—Java.

Genus MOPS Lesson, 1842.

Mops mops (de Blainv.). Free-tailed Bat.

Molossus mops H. D. de Blainville, Osteogr., Vespertilio, 1840, p. 101: Sumatra.

Dysopes mops F. Cuv., Dents des Mamm, 1824, p. 250: *nom. nud.*, *fide* Sherborn.

Mops indicus Less., N. Tab. Règne Anim. 1842, p. 18: "Inde continentale".

Distr.—Sumatra; Malay Peninsula.

Genus MORMOPTERUS Peters, 1865.

* **Mormopterus doriae** And.

Mormopterus doriae Anderson, Ann. Mus. Civ. Stor. Nat. Gen. III (XLIII), 1907, p. 42: Soekaranda, Deli, N. W. Sumatra.

Distr.—Sumatra.

Javan race is darker, rather mousy in colour, and less brown than animals from various parts of Burma etc. The first name applied to a Javan specimen is *tenuis*, and fortunately a type locality is provided in the original description, albeit indirectly, "the hills of Prowoto" (on modern Dutch maps, Proewoto, east of Semarang in Mid-Java). I have specimens from Koedoes, nearby. For the western race *dilatatus* is available. The description is meagre, but the one useful character mentioned, width of wings, indicates a larger form than the author's *tenuis*. I have seen so few specimens from elsewhere in Malaysia that for the moment I leave them under the typical name.

Genus CHEIROMELES Horsfield, 1824.[1]

Cheiromeles torquatus. Hairless Bat.

Cheiromeles torquatus torquatus (Horsf.).

Cheiromeles torquatus Horsfield, Zool. Researches Java, descr. and pl.: Penang.

Dysopes cheiropus Temm., Mon. Mamm. I, 1826, p. 218, pl. LXVI: Siam.

Distr.—Malay Peninsula; Rhio Archipelago; Sumatra; Borneo.

Cheiromeles torquatus caudatus Temm.

Cheiromeles caudatus Temminck, Monogr. Mamm. II, 1841, p. 348, pl. LXVI: Java.

Distr.—Java; Banka.

* **Cheiromeles torquatus jacobsoni** Thos.

Cheiromeles jacobsoni Thomas, Ann. Mag. Nat. Hist. (9), XII, 1923, p. 592: Simalur.

Distr.—Simalur Island, West Sumatra.

Order PRIMATES

Family SIMIIDÆ.

Genus SIMIA Auct, *nec* Linn.[2]

Simia satyrus Auct. (*nec* Linn. 1758). Orang Utan.

Simia satyrus satyrus (by Fiat); Linn. 1766.

Simia pygmaeus Linn., Anthropomorpha, 1760 (Upsaliæ), p. 6: "habitat in Africa," *error*, Borneo, or Sumatra.

Simia Satyrus Linn., Syst. Nat. I, 1766, p. 34 (nec 1758, p. 25, a chimpanzee).

Pongo wurmbii Tiede., Zool., 1808, p. 329: Borneo.

Simia morio Owen, Proc. Zool. Soc. IV, 1836 (1837), p. 92: Borneo.

Pithecus brookei Blyth, Journ. Asiat. Soc. Beng. XXII, 1853, p. 375: Sarawak.

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[1] *Cheiromeles torquatus.* Specimens from Banka (forearm of an aged animal, 73 mm.), and Java (no measurements available) are, *fide* Sody, considerably smaller than true *torquatus*.

I find that in or near its type locality this bat has a forearm of about 79–85 (82) mm.; further south, in Singapore and the nearer islands of the Rhio Archipelago the range is almost identical, 78–85 (81) mm. Neither do specimens from Tioman Island differ. Eleven specimens from Sarawak are very slightly smaller, 75–82 (79) mm. I have therefore accepted a small southern race, but do not know much about its geographical range. No material from Sumatra is available. I have assumed that *jacobsoni* differs from *caudatus*.

[2] *Simia satyrus* and *Pithecus.* Contrary to the custom of this "Handlist", and my usual practice, in the cases of the names *Simia satyrus* and *Pithecus*, I have not followed the "International Rules of Zoological Nomenclature". My reasons for this will be obvious to most mammalogists although, in view of

Opinion 114 published by the International Commission (Smiths. Misc. Coll. 73, 6, 1929, p. 25) some will not approve of the action. The subject is discussed in Zool. Anz. XLIV, 1914, p. 284; Proc. Zool. Soc. 1924, p. 347; and the correspondence in Nature, 118, 1926, p. 411. For the orthodox the correct name of the orang-utan is *Pongo pygmaeus* (Linn.). A detailed study of the many forms proposed by Selenka and others now seems outside the province of the faunist, or practical systematic zoologist, for it has not been proved that these forms exist as geographical races (subspecies). Basic references are Rothsch., Proc. Zool. Soc. 1904, p. 413 and, of course, Elliot, Rev. Prim. III, 1913, p. 192.

Some of the older references relating to the orang-utan are lacking in Singapore and Mr. F. C. Sawyer of the Zoological Library was kind enough to check these for me, with Dr. Sherborn's collaboration. *Simia pygmaeus* Linn. 1760, is from this source.

Simia agrias Schreber is given in the synonomy of *S. satyrus* by Fischer, Synopsis Mammalium, 1829, p. 10. The reference quoted is Schreber t. II C. Mr. Sawyer writes that there is no trace of this name, or of a pl. II C. in the Brit. Mus. (Nat. Hist.) copy of Schreber. Pl. II B is a figure of *Simia satyrus*.

Another reference I cannot trace in Singapore is Blainville's *Pithecus Wallichii* (*wallacci* fide Elliot). Mr. Sawyer says that there is no mention of the name in the "Ostéographie". Gray (1870) gave the reference as *Journ. de Phys. 1818.*

"*Simia abelii.*—The author of the paper commencing on p. 489 of Asiat. Res. XV, 1825, is Clarke Abel. It is an account of an Orang-Outang found on the Island of Sumatra. There is no generic or specific name given in this paper." This is Mr. Sawyer's reply when I queried Elliot's reference (III, p. 194). The first actual naming was by Lesson in 1827.

Two other references I have not seen are, as given by Gray 1870.—*Simia rufus* Less. p. 40 and *Satyrus knekias* Meyen, 1856.

Whether or not the Bornean and Sumatran forms of *Simia* are distinct is a subject about which much has been written, but the first reference known to me in which an experienced systematic mammalogist compared series of exactly known provenance is Lyon, Proc. U. S. Nat. Mus. XL, 1911, p. 145, wherein two subspecies are accepted. During the last eighteen years I must have seen several hundreds of orang-utans in captivity in Singapore where, until recent concerted action by the Dutch and British Governments reduced operations to a reasonable limit, the entrepôt trade was very large, but I have never been able to compare, directly, a reasonable number of precisely localized specimens and therefore cannot confirm the

Pithecus owenii Blyth, Journ. Asiat. Soc. Beng. XXII, 1853, p. 375: Sarawak.

Pithecus curtus Blyth, Journ. Asiat. Soc. Beng. XXIV, 1855, p. 525: Sarawak.

Pithecus satyrus landakkensis Selenka, Sitz. Koenigl. Akad. Wiss., Berlin, XVI, 1896, p. 384: "in Landak'schen (Landstrich nahe der noerdlichen Westkuste Borneo's"): Dutch North-West Borneo.

P [*ithecus*] *satyrus batangtuensis* Selenka, *loc. cit.*: "vom rechten Ufer des Ketungau—Flusses bis abwaerts am rechten Ufer des Kapuas—Stromes nahe Batangtu": Dutch North-West Borneo.

P [*ithecus*] *satyrus dadappensis* Selenka, *loc. cit.*: "Wohn bezirk am linken Katungau—Ufer, in der Umgebung des Dadap—Berges (noerdlich vom Genepai)": Dutch North-West Borneo.

P [*ithecus*] *satyrus genepaiensis* Selenka, *tom. cit.* p. 385: "am linken Ufer des Katungau in der Naehe des Berges Genepai": Dutch North-West Borneo.

P [*ithecus*] *satyrus skalauensis* Selenka, *loc. cit.*: "am linken Ufer des Katungau, westlich vom Dadap—Gebiete": Dutch North-West Borneo.

P [*ithecus*] *satyrus rantaiensis* Selenka, *loc. cit.*: "Rantai, noerdwestlich vom Skalau-gebiete": Dutch North-West Borneo.

P [*ithecus*] *tuakensis* Selenka, *loc. cit.*: "obern Mrekai-Flusse": Dutch North-West Borneo.

Distr.—Borneo.

Simia satyrus abelii (Less.).

Pongo abelii Lesson, Man. Mamm. 1827, p. 32: Sumatra.

Pithecus bicolor Is. Geoff., Archiv. Mus. Hist. Nat. Paris, II 1841, p. 526: Sumatra.

Simia Gigantica Pears., Journ. Asiat. Soc. Beng. X, 1841, p. 660: Sumatra.

P [*ithecus*] *sumatranus deliensis* Selenka, Sitz. Koenigl. Akad. Wiss., Berlin, XVI, 1896, p. 386: "im linken Stromgebiete des Langkat und in Deli": North-East Sumatra.

P [*ithecus*] *sumatranus langkatensis* Selenka, *loc. cit.*: alternative name for *P. s. deliensis*.

P [*ithecus*] *sumatranus abongensis* Selenka, *loc. cit.*: "noerdlich vom Stromgebiete des Langkat, in der Naehe des Berges Abong-abong": North-East Sumatra (*nom. nud.*).

Distr.—Sumatra.

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existence of two races. Nevertheless, it always seemed to me, as far as it was possible to compare things seen at intervals of time and in different places that, on an average, the more cinnamon and less maroon coloured adults came from Sumatra and the more deeply coloured, almost purple-maroon beasts from Borneo. Furthermore, it is my belief that I have never seen a Bornean specimen alive that equals in size any of several old males from Sumatra. This again is, of course, evidence of no great value. References likely to be overlooked are E. Banks in Journ. Mal. Br. Roy. Asiat. Soc. IX, pt. 2, 1931, p. 117 (an interesting note on the distribution in Sarawak) and Chasen Journ. Mal. Br. Roy. Asiat. Soc. 1923, p. 257 (maximum size).

Family HYLOBATIDÆ

Genus HYLOBATES Illiger, 1811.[1]

Hylobates syndactylus. Siamang.

Hylobates syndactylus syndactylus (Raffles).

Simia syndactyla Raffles, Trans. Linn. Soc. XIII, 1821, p. 241: Bencoolen, West Sumatra.

[*Siamanga syndactylus*] *volzi* Pohl, Zool. Anz. XXXVIII, 1911, p. 51: Padang Highlands, Sumatra.

Distr.—Sumatra.

Hylobates syndactylus continentis (Thos.).

Symphalangus syndactylus continentis Thomas, Ann. Mag. Nat. Hist. (8), II, 1908, p. 301: Selangor—Pahang Boundary, 3,000 ft., Malay States.

Distr.—Malay States.

Hylobates klossii Mill. Kloss Gibbon.

Symphalangus klossii Miller, Smiths. Misc. Coll. XLV, 1903, p. 70, pls. XVII—XIX: South Pagi Island, Mentawi Group.

Distr.—Islands of North and South Pagi, Sipora and Siberut, Mentawi group, West Sumatra.

Hylobates agilis. Dark-handed Gibbon.

Hylobates agilis agilis Cuv.

Hylobates Agilis F. Cuvier, in E. Geoffroy St. H. and F. Cuvier, Hist. Nat. Mamm. 1821, Le Wouwou, p. 3: West Sumatra.

Hylobates rafflei (sic) E. Geoff. St. H., Cours. Hist. Nat. 1828, p. 34: West Sumatra.

Hylobates unko Less., Hist. Nat. Mamm. Ois. III, 1829, p. 400: Sumatra.[2]

Hylobates albo nigrescens and *H. albo griseus* Ludeking, Geneesk. Tijdschr. Ned. Ind. (9), N.S. 4, 1862, p. 36: Agam, West Sumatra.

Distr.—Malay States: Sumatra.

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[1] *Hylobates.* Revisions: Pocock, Proc. Zool. Soc. 1927, pp. 719–741; Kloss, Proc. Zool. Soc. 1929, pp. 114–127. On the vexed question of genera *see* Chas. and Kl., Proc. Zool. Soc. 1927, p. 808; Schultz, Human Biol. V, 1933, p. 212: and Miller, Journ. Mamm. XIV, 1933, p. 159. The following names are available for Malaysian forms if reduction of *Hylobates* is required.—*Symphalangus* Gloger, (*syndactylus*); *Hylobates* Ill., (*lar*, *agilis*); *Brachitanytes* Schultz, (*klossi*). For the name of the Javanese gibbon *see* Cabrera, Proc. Zool. Soc. 1930, p. 257. In the Malay Peninsula and Sumatra *lar* and *agilis* occur side by side as very distinct forms, but in Java and Borneo only one species is found in each island although in the latter island it is subject to much geographical variation. Which of the two mainland species (*agilis* and *lar*) *moloch* represents is a moot point.

[2] *H. unko.* I have not seen this reference.

Hylobates lar. White-handed Gibbon.

Hylobates lar lar (Linn.).

Homo lar Linn.,Mantiss. Plant. II, 1771, p. 521: restr. Malacca, Kloss, 1929.

Simia longimana Schreb., Saeugth. I, 1774, p. 66, pl. III: Malacca.
Pithecus varius Latr., Sonnini's Buff., XXXVI, 1804, p. 276: Malacca.
Pithecus variegatus E. Geoff., Ann. Mus. Hist. Nat. Paris, XIX, 1812, p. 88: Malacca.

Distr.—Malay States.

Hylobates lar entelloides Geoff.

Hylobates entelloides Is. Geoff., Comp. Rend. Ac. Sci. (Paris), XV, 1842, p. 717: Malay Peninsula, lat. 12° N.

Distr.—Peninsular Siam.

Hylobates lar albimanus (Vig. and Horsf.).

Simia albimana Vigors and Horsfield, Zool. Journ. IV, 1828, p. 107: West Sumatra.

Distr.—Sumatra.

Hylobates moloch. Sunda Island Gibbon.

Hylobates moloch moloch (Audeb.).

Simia moloch Audebert, Hist. Nat. Singes, 1797, 1st fam., sect. II, pl. II: Java.

Simia leucisca Schreb., Saeugth. 1799, pl. 3 B: Java.
Pithecus cinereus Latr., in Sonnini's Buffon, XXXVI, 1804, p. 277: Java.

Distr.—Java.

Hylobates moloch mülleri Mart.

Hylobates mülleri Martin, Nat. Hist. Mamm. Anim. 1841, p. 444: South Borneo.

Distr.—Borneo (south-east).

Hylobates moloch albibarbis Lyon.

Hylobates mülleri albibarbis Lyon, Proc. U.S. Nat. Mus. XL, 1911, p. 142: near Sukudana, South-West Borneo.

Distr.—Borneo (south-west).

Hylobates moloch abbotti Kloss.

Hylobates cinereus abbotti Kloss, Proc. Zool. Soc. 1929, p. 119: Landak River, Pontianak, South-West Borneo.

Distr.—Borneo (west).

Hylobates moloch funereus Geoff.

Hylobates funereus Is. Geoff., Comp. Rend. Ac. Sci. (Paris), XXXI, 1850, p. 874: Island of Sulu (introduced).

Distr.—Borneo (north).

Family CERCOPITHECIDÆ.

Genus MACACA Lacépède, 1799.

Macaca speciosa.[1] Stump-tailed Macaque.

[**Macaca speciosa speciosa** Cuv.

Macacus speciosus F. Cuvier, Hist. Nat. Mamm. III, 1825, pl. 47: no locality; probably Assam, or Cachar, vide And., Zool. Res., 1878, p. 50.

Distr.—Extralimital.]

Macaca speciosa rufescens And.

Macacus rufescens Anderson, Proc. Zool. Soc., 1872, p. 204: description based on a menagerie specimen from Singapore where the species does not occur. "Malayan Peninsula," And., Zool. Res. 1878, p. 80.

Distr.—Peninsular Siam (south to the states of Trang and Patalung).

Macaca nemestrina.[2] Pig-tailed Macaque.

Macaca nemestrina nemestrina (Linn.).

Simia Nemestrina Linn., Syst. Nat. 12th ed., I, 1766, p. 35: Sumatra.

Simia Carpolegus Raffles, Trans. Linn. Soc. XIII, 1821, p. 243: Bencoolen, West Sumatra.

Macacus (maimon) brachyurus H. Smith, Intr. Mamm. in Nat. Libr. I, 1842, p. 103, pl. I (albino): Sumatra.

Macaca broca Mill., Proc. U.S. Nat. Mus. XXIX, 1906, p. 558: Sapagaya River, North-East Borneo.

* *Macaca nemestrina nucifera* Sody, Natuurk. Tijdschr. Ned. Ind. XCVI, 1936, p. 42: Banka Island.

Distr.—Malay Peninsula (north to about Trang). Sumatra; Banka Island; Borneo.

Macaca nemestrina andamanensis Bartl.

Macacus andamanensis Bartlett, Land and Water, VIII, 1869, p. 57: Andaman Islands, ex Burma.

Distr.—Peninsular Siam (south to about Trang); Junk Seylon.

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[1] *Macaca speciosa.* For discussions regarding the specific name *see* Pocock, Proc. Zool. Soc. 1925, p. 1571 (footnote): Thos., Proc. Zool. Soc. 1927 p. 43; Osgood, Field Mus. Nat. Hist. (Zool. ser.), XVIII, 1932, p. 211; McCann, Journ. Bomb. Nat. Hist. Soc. XXXVI, 1933, p. 797. Specimens from Peninsular Siam and South Annam are sufficiently distinct to merit subspecific names, and on the limited material I have seen the former are nearest to *rufescens.* I do not believe in the occurrence of this species in Borneo, or Perak (*M. leoninus*, And., Cat. Mamm. Ind. Mus. I, 1881, p. 71, spm. *e* is *rufescens fide* Rob. and Kloss *MS*). *Lysodes* Gistel, 1848, (type, *speciosa*) is available for those who prefer small genera.

[2] *Macaca nemestrina.* Revisions: Miller, Proc. U.S. Nat. Mus. XXXIX, 1906, p. 555; Pocock, Journ. Bomb. Nat. Hist. Soc. XXXV, 1931, p. 297. No detailed comparison of adequate material from Sumatra and the Malay Peninsula seems ever to have been made. I cannot accept the species as indigenous in Penang and Singapore.* *M. nem. nucifera* is a dimensional race of a macaque based on a single skull.

* But in 1941 a troop of some 20-30 Berok-monkeys (male, female & young) lived in the Seletar Reservoir area in Singapore. They were seen several times by Ngadiman, the forest-ranger & [illegible] confirmed this

Macaca nemestrina pagensis Mill.[1]

Macacus pagensis Miller, Smiths. Misc. Coll. XLV, 1903, p. 61, pls. XI, XII, XIII: South Pagi Island, West Sumatra.

Distr.—Pagi Islands, West Sumatra.

Macaca irus.[2] Long-tailed, or Crab-eating Macaque.

Macaca irus irus F. Cuv.

Macacus irus F. Cuvier, Mémoires du Mus. d'Hist. Nat. Paris, IV, 1818, p. 120: Sumatra.[3]

Simia fascicularis Raff., Trans. Linn. Soc. XIII, 1821, p. 246: Sumatra.

Macacus carbonarius F. Cuv., Hist. Nat. Mamm. III, 1825, Pl. 52: Sumatra.

Semnopithecus kra Less., H.N. Mamm. Ois. depuis 1788, IV, 1830, p. 20: Sumatra.

Macacus aureus E. Geoff., Voy. Bélang., Zool. 1834, p. 58, 76: Sumatra.

Pithecus alacer Ell., Ann. Mag. Nat. Hist. (8), IV, 1909, p. 253, Kundur Island, Rhio Arch.

Pithecus karimoni Ell., *tom. cit.* p. 255: Karimon Island, Rhio Arch.

Pithecus dollmani Ell., *tom. cit.* p. 256: Changi, Singapore Island:

Pithecus bintangensis Ell., *tom. cit.* p. 257: Bintang Island, Rhio Arch.

Pithecus lapsus Ell., Proc. U.S. Nat. Mus. XXXVII, 1910, p. 343: Banka Island.

Pithecus agnatus Ell., *tom. cit.* p. 344: Tuangku Island, Batu Islands.

Pithecus carimatae Ell., *tom. cit.* p. 346: Karimata Island.

Pithecus mandibularis Ell., *tom. cit.* p. 347: near Pontianak, Borneo.

Pithecus lingae Ell., *tom. cit.* p. 349: Lingga Island.

Pithecus impudens Ell., *tom. cit.* p. 350: Sugi Island, Rhio Arch.

Pithecus mansalaris Lyon, Proc. U.S. Nat. Mus. LII, 1916, p. 452: Mansalar Island, West Sumatra.

Distr.—Malay Peninsula including the islands of Langkawi, Terutau, the Butangs, Penang and Singapore. Sumatra; many islands of the Rhio and Lingga Archipelagos; Banka; Billiton; Banjak Islands; Mansalar Island; Batu Islands; Borneo and coastal islands; North Bornean Islands; Karimata Islands.

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[1] Said to occur on other islands of the Mentawi group, but no specimen has yet been obtained other than in the Pagi Islands.

[2] *Macaca irus.* In colour, size, proportions and cranial characters this monkey is extremely variable and there is also much variation with age. This variation masks the local, or racial variation which is usually not very striking, even when good series of specimens of the same sex and age are compared. Unfortunately, all the collections I have examined have been made without special purpose and contain only a very small minority of adult males. Variation in colour in any given locality seems often due to *strain* (family, or group), and individuals living in exposed places such as near sea-beaches are often "bleached." Broadly, but only very broadly, the general trend of the geographical variation is towards slightly smaller size and

warmer colour from north to south with a tendency towards even smaller size and a relatively shorter tail on small islands. Few, if any, of the proposed subspecies were based on more than half a dozen specimens (including females and immature animals), and the cranial characters used by Elliot have not been demonstrated to be other than individual, or associated with stages of growth, or senescence, which affect the muzzle especially, while dimensions, unless founded on the averages of large series in the case of this monkey are more than usually unreliable. On the standard of diagnosis maintained by Elliot, that is, observed differences between very small and uneven series, many more names could be founded on the material before me.

Common in the mangrove belt, many other types of country, and on almost all coastal islands, including even the smallest, *M. irus* swims well and readily: it is also often carried about in captivity. The species is extremely difficult to arrange in subspecies, partly because of the variation mentioned above, and partly because good series of topotypes from Sumatra are not available for study. Nevertheless, subspecies do exist and nobody looking at, say, the blackish crowned races from the islands of Koh Kram (South-East Siam), and Condore could confuse them with the almost golden brown crowned animals of Pulau Tioman.

I contend, however, that in the case of many of the proposed races, neither the published diagnosis, nor the additional material collected since the publication of the original description demonstrate any *geographical* variation. The bestowed names are merely available if, in the future, such races are proved to exist.

Adult males from the Malay Peninsula, Sumatra and Borneo are much alike, but as Kloss pointed out in Journ. Nat. Hist. Soc. Siam, III, 1919, p. 347, examples of this species from the north of Peninsular Siam are dull in colour whereas further south, an ochraceous, or even ferruginous tone is found in the majority. Animals north of Lat. 9° N. are all dull coloured; south of Lat. 8° N. most specimens are rather warmer in colour, but a small minority includes dull coloured specimens exactly like those from the north. It also seems likely that this macaque runs large in the north of the Peninsula. A number of skulls from Peninsular Siam includes some as large, or even slightly larger than the type of *capitalis*. An old male from Pulau Panjang has the greatest length of the skull, 126·5 mm., basal length, 93 mm.; and zygomatic width, 89.5 mm., and, furthermore, the *average* size is slightly larger in the north than in the south. An aged male from Singapore with the greatest length of the skull, 117 mm., the basal length, 84 mm.; and the zygomatic width, 80 mm. is the largest of a fair number examined from the southern third of the Peninsula, and, on the limited number examined, it is these southern animals that agree with Sumatran topotypes of *M. irus*. It is possible that specimens from the *west* coast of Peninsular Siam, including the coastal islands south to Junk Seylon (but not Pulau Panjang) should be referred to *aurea* Geoff. (Pegu) on account of the whorl on the cheeks. But perhaps this feature is not constant hereabouts for skins from the remainder of Peninsular Siam and thence north through South-West Siam and all over Siam proper have the hair growth as in *irus*. A small series suggests that in the *north* of Borneo the species again runs to large size and paleness. For the northern continental race I have used the name *capitalis* Ell., which is of certain application, but *vitiis* of the same author from the Mergui Archipelago, which I have not seen, has page priority and may be applicable. The dividing line between the two sections seems to run through the southern part of Peninsular Siam. On the west coastal islands of the Peninsula the species seems undifferentiated, but on the east coast the macaques of Tioman and Tinggi Islands are very bright in colour, especially on the crown, and those from the Redang Islands have noticeably greyer limbs than most examples from the mainland.

On some island groups in the South China Sea the species shows about the same range of colour variation as in the south of the Malay Peninsula, but the general size averages smaller and the tail is, usually, but not always, relatively shorter. The skulls of these island animals are so variable that I prefer not to introduce them into this short discussion: no two are alike. Whether there is any geographic (racial) variation within the groups remains to be seen. I cannot appreciate such variation on the material before me, or in the published descriptions of other material and therefore use the prior name, *pumila*, given to a specimen from the Tambelan Islands, for the whole association.

On the islands of the Rhio and Lingga Archipelagos and on Banka and Billiton the majority of the macaques seems inseparable from *M. i. irus*, but there is also some individual divergence towards the standard accepted for *pumila*.

The deep water islands of the Simalur group off the west coast of Sumatra have developed a subspecies not unlike that found in the Nicobar Islands, but on other islands of the West Sumatran chain standing in shallower water than Simalur, this macaque is so like the Sumatran animal that I can see no reason for separation except in the case of the rather darker Nias form.

The Javan subspecies is sufficiently distinct to merit a name. Dr. K. W. Dammerman informs me that specimens collected at the type locality of *"resima"* are *mordax* of which form he considers the type of *resima* to be an abnormal and probably

Macaca irus capitalis (Ell.).
Pithecus capitalis Elliot, Proc. U.S. Nat. Mus. XXXVIII, 1910, p. 350: Trang, Peninsular Siam, about Lat. 7° 30′ N.
Distr.—Peninsular Siam (not extreme south) and the coastal islands, including Koh Pennan and Koh Samui.

Macaca irus argentimembris Kl.
Macaca irus argentimembris Kloss, Ann. Mag. Nat. Hist. (8), VII, 1911, p. 116: Penang Island, Gt. Redang Islands (not Penang Island in the Straits of Malacca).
Distr.—Great Redang Islands, off Trengganu, east coast Malay Peninsula.

Macaca irus læta (Ell.).
Pithecus laetus Elliot, Ann. Mag. Nat. Hist. (8), IV, 1909, p. 255: Tinggi Island.
Distr.—Islands of Tioman and Tinggi, off Pahang and Johore, east coast, Malay Peninsula.

Macaca irus pumila Mill.
Macacus pumilus Miller, Proc. Wash. Acad. Sci. II, 1900, p. 241: Bunoa Island, Tambelan Islands.
* *Pithecus lingungensis* Ell., Proc. U.S. Nat. Mus. XXXVIII, 1910, p. 344: Lingung Island, North Natuna Islands.
* *Pithecus lautensis* Ell., *tom. cit.* p. 345: Pulau Laut, North Natuna Islands.
Pithecus sirhassenensis Ell., *tom. cit.* p. 345: Sirhassen Island, South Natuna Islands.
Distr.—Anamba, Tambelan, North (including Bunguran) and South Natuna Islands, China Sea.

Macaca irus fusca Mill.
Macacus fuscus Miller, Proc. U.S. Nat. Mus. XXVI, 1903, p. 476: Simalur Island.
Distr.—Simalur Island, West Sumatra.

***Macaca irus lasiae Lyon.**
Pithecus fuscus lasiae Lyon, Proc. U.S. Nat. Mus. LII, 1916, p. 453: Lasia Island.
Distr.—Lasia Island, near Simalur, West Sumatra.

Macaca irus phæura Mill.
Macacus phaeura Miller, Smiths. Misc. Coll. XLV, 1903, p. 63: Nias Island.
Distr.—Nias Island, West Sumatra.

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captive animal. For lack of material I cannot discuss the two forms described from islands in the Java Sea.

An individual *M. irus* has been recorded from the Cocos-Keeling Islands (Wood-Jones, "Corals and Atolls," 1912, p. 298).

[3] *See* Cabera, Ann. Mag. Nat. Hist. (8), VI, 1910, p. 620, for the type loc. of *M. irus*.

Erratum.—Bull. Raffles Mus., 6, 1931, p. 50, where the table of measurements refers to *Macaca* the figures in the second column are those of the tail.

Macaca irus mordax Thos. and Wrought.
Macaca mordax Thomas and Wroughton, Ann. Mag. Nat. Hist. (8), III, 1909, p. 380: Tjilatjap, West Java.
Macaca resima Thos. and Wrought., Ann. Mag. Nat. Hist. (8), III, 1909, p. 381: Tasikmalaja, West Java.
Distr.—Java; Bali.

* **Macaca irus cupida (Ell.).**
Pithecus cupidus Elliott, Proc. U.S. Nat. Mus. XXXVIII, 1910, p. 348: Mata Siri Island.
Distr.—Mata Siri Island, Java Sea.

* **Macaca irus baweana (Ell.).**
Pithecus baweanus Elliot, Proc. U.S. Nat. Mus. XXXVIII, 1910, p. 347: Bawean Island.
Distr.—Bawean Island, Java Sea.

Family COLOBIDÆ.

= Presbytis

Genus PITHECUS E. Geoff. and Cuv. 1795.[1]

Pithecus femoralis[2] Banded Leaf Monkey.

Pithecus femoralis femoralis (Mart.).
Semnopithecus femoralis Martin, Charlesworth's Mag. Nat. Hist. II, 1838, p. 436: Singapore, *Miller*, 1913.
Semnopithecus neglectus Schleg., Mus. Pays-Bas, VII, Simiæ, 1876, p. 47: Singapore.
Distr.—Singapore Island.

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[1] *Pithecus.* For the use of this name *see* Thos., Ann. Mag. Nat. Hist. (8), XVII, 1916, p. 179. For those who prefer to split the small group of Malaysian langurs yet further the following names are available. *Presbytis* Esch., 1821 (*mitrata = aygula*); *Trachypithecus* Reich., 1862 (*pyrrhus*); *Corypithecus* Trouess., 1879 (*frontatus*); *Lophopithecus* Trouess., 1879 (*rubicundus; the "femoralis"* section is also included). My reasons for retaining *Pithecus* are given under *Simia* above.

[2] *Pithecus femoralis:* See Pocock, Journ. Bomb. Nat. Hist. Soc. XXXII, 1928, p. 675: Proc. Zool. Soc. 1934 (1935), p. 904 (wherein there is wholesale and thoroughly unjustifiable "lumping"); Miller, Journ. Mamm. 1934, p. 125.

Accepting the definition of a subspecies as a geographic race I can see no reason why all the forms of the *femoralis* group described from the Malay Peninsula, Sumatra and Borneo should not be grouped together in one species, for although two forms often occur close together I cannot confirm by trustworthy records that they are ever found actually side by side. In a number of cases intermediates have been shown to exist.

Dealing first with the Malay Peninsula we find in the extreme north and south, the darkest (blackish) subspecies:

between them the paler (grey-brown) forms occur. In Singapore Island is found true *femoralis*. Johore and South-East Pahang are occupied by a monkey much like *femoralis* and in one or two cases South Johore and Singapore specimens are hard to separate, but taken as a whole the animals from the mainland have more white on the underparts than the others and specimens from Segamat in the north of Johore are very distinctly diverging towards *siamensis* although still nearer to *femoralis* than to that form. For this intermediate population on the eastern side of the Peninsula the name *australis* is available. In the north of the Peninsula the very distinct *robinsoni* (originally based on a white mutant and better known in literature as "*keati*") extends as far south as the Larut hills in Perak.

An important point now demands attention. The greyish monkeys of this group occupying, roughly, the country between the two blackish forms are divisible into two well-defined subspecies. In one (*a*), the outer sides of the thighs, and the buttocks are greyish, thickly sprinkled with long, black hairs. This form occurs in the territory of Malacca; in the adjacent state of Negri Sembilan; and in parts of Selangor where it intergrades with the next form. In the second form (*b*), the outer sides of the thighs and buttocks are white, not grey, and without a sprinkling of long black hairs; also the dark stripe on the upper aspect of the thigh is smaller and the rest of the limb is paler than in (*a*). This paler form has a more extensive range than (*a*) embracing as it does, at least the south of Kelantan, most of Perak and Selangor, and North-West Pahang. (*a*) provides a link between *femoralis* and (*b*) on the western side of the Peninsula.

Elliot used *nubigena* (Malacca) and *dilecta* (Selangor) for these two forms. Robinson and Kloss (Ann. Mag. Nat. Hist. (9), VII, 1921, p. 397) then expressed their opinion that *nubigena* was a pure synonym of *siamensis* the type locality of which is really "Malacca", not Siam. But "Malacca" here, as so often in the past, does not mean the present restricted territory of Malacca, but rather the whole of the Malayan coast that was not Siamese, and Dr. G. C. A. Junge of the Leiden Museum who was good enough to compare some skins I sent to him from Singapore with the types of *siamensis* tells me that it is quite clear that this name belongs to the race with white buttocks: *nigrimanus* is the same as *siamensis* (*see* Is. Geoff., Cat. Meth. Mamm. Ois. 1851, p. 16). In my opinion *Semnopithecus albocinereus* Desm. is quite indeterminable, and *Presbytis cinerea* Gray is a *nom. nud.*

In Sumatra the situation is obscured by the great plasticity of the group shown in that island, by the scarcity of precise modern records, especially from the north of the island, and by the almost certain unreliability either in identification, or location of a number of the older records.

The grey and brown *catemanus* of the Kateman and Indragiri rivers is geographically adjacent to the very similarly coloured Rhio Archipelago forms from which, however, it seems different enough to merit recognition. Either *rhionis* or *canus*, or an unidentified race also occurs on the islands of Batam and Galang. If certain old records are to be accepted as exact for locality, monkeys of somewhat similar appearance to the above mentioned forms are found throughout the low country on the east coast and along the rivers inland to Lahat in the Palembang basin (*e.g. Schneider*, but whose "*Semnopithecus obscurus*" in the Leyden Museum from "Lahat" are correctly identified, but certainly very wrongly localized as no form of this latter monkey occurs in Sumatra). North of this restricted group of brown and grey monkeys on the east coast the blackish subspecies *percurus* of the Siak basin and nearby coastal islands is again very like and geographically opposite to the blackish South Malayan race (*femoralis*). Then, just as *femoralis* changes once more from black to grey on the Peninsular side of the Malacca Strait so does *percurus* give way to *paenulatus* on the Sumatran coast north of the range of *percurus*. I am completely ignorant of the situation north of the Toba lake. Various identifications of "*albocinerus*" and *melalophus* from the northern part of the island are unsupported by skins, or seem in other ways to need confirmation. Coming down the west coast of the island there is, in the vicinity of Tapanuli Bay, a form very like the blackish *percurus*, but probably separable. Mt. Ophir further south, is the type locality of the little known *sumatranus* the type of which has the upper parts dark brown, the outer sides of the limbs blackish, the throat, abdomen, inner sides of the limbs and under side of the tail, white, and the chest blackish. From the Padang Highlands I have seen an intermediate between *sumatrana* and one of the red races, *nobilis*.

According to published record it is in the neighbourhood of Mt. Ophir that we meet for the first time one of the reddish forms of *femoralis*, but I have seen no specimens from that exact neighbourhood except the old specimens in the Leyden Museum and I do not think any others exist. New, and *exactly localized* material is necessary before we can form any idea of the situation in that area for in Sumatra the boundaries of these langur races are often very near to each other. "Red" monkeys are now found along the main range and its immediate environs almost down to the southern point of the island where, however, they are replaced by another race, *fusco-murinus*. But these red monkeys cannot all be referred to one race, and the old authors, and Elliot, were quite right in recognizing two forms. I have before me the beautiful series from the Zoological Museum at Buitenzorg, in addition to the collections of the Raffles Museum, more than sixty skins in all, and all from this critical south-western corner of the island. The individual variation, great though it is, does not mask the bold geographical associations that stand out as well as in the subspecies of any primate known to me. It is not always easy to put a name on a particular specimen and isolated skins, without precise labels, are useless for comparison and only misleading; as is the totally inadequate material in the British Museum.

Starting from Korinchi Peak we have a form very variable in all the details of colour: the hands and feet, for instance, may be black, or red. The variation of a good series was described by Robinson and Kloss in 1918. But whatever its colour this monkey is much brighter and redder than animals from further south, on the mountains inland from Bencoolen.

The type of Gray's *nobilis* belongs to the redder, northern form and the specimen almost certainly came from the neighbourhood of Indrapura. Whether or not there is another race even further north to which the name of *ferrugineus* (Padang) applies cannot yet be decided. But be it noted that Robinson and Kloss have examined a very *pale* coloured animal from the Ophir district, whence also came Müller and Schlegel's "var. *aurata*". I have seen this latter specimen in Leyden. It is mounted and very faded. In colour it is almost uniformly brownish-buff with blackish feet, with a small dark spot on the crown. In the hidden parts of the pelage there is a tinge of orange and at the time I put it down as a much faded example of "*melalophos*" (*sen. lat.*). A single specimen from Kajoetanan, north of Padang is very like *nobilis*.

The description of *flavimanus* clearly applies to animals like specimens from the neighbourhood of Bencoolen. In these the under parts are, almost invariably, white, not buffy or rufous as in the northern race, and the general colour above is much less red and more buffy. In the original description *flavimanus* was, no doubt, compared with *nobilis*. Typical of this duller race, *melalophos* (syn. *flavimanus*), are specimens from Mt. Dempo and Bukit Sanggul; one specimen from Bukit Sanggul and some from the foothills at Bukit Doeloe, Loeboeklinggau and Pageralam (all these places are marked on the modern Dutch maps) are paler, and can be regarded as altering towards the form found in the lowlands of Palembang which seems to be without a name.

P. fem. fusco-murinus in its extreme form is entirely without trace of brown in the pelage. Adults and juveniles of both sexes are at least often entirely white, grey and black. Such examples have the forehead, sides of the head, entire under-parts,

Pithecus femoralis australis (Mill.).

Presbytis australis Miller, Smiths. Misc. Coll. LXI, 21, 1913, p. 28: Jambu Luang, east coast Johore.

Distr.—Malay States (extreme south).

Pithecus femoralis nubigena (Ell.).

Presbytis nubigena Elliot, Ann. Mag. Nat. Hist. (8), IV, 1909, p. 268: Malacca.

Distr.—Malay States (part).

Pithecus femoralis siamensis (Müll. and Schleg.).

Semnopithecus siamensis Müller and Schleg. in Temm., Verh. nat. ges. ned. overz. bezitt, Zool. (Mamm.), 1841, p. 60: "Malacca", *Schleg.* 1876=Malay States.

Semnopithecus nigrimanus Is. Geoff., Arch. Mus. H.N. (Paris), II, 1843, p. 546: Java, error = Malay States.

Presbytis dilecta Elliot, Ann. Mag. Nat. Hist. (8), IV, 1909, p. 270: Dusun Tua, Selangor.

Distr.—Malay States (part).

Pithecus femoralis robinsoni (Thos.).

Presbytis robinsoni Thomas, Proc. Zool. Soc. Abs. 1910, p. 25: Trang, Peninsular Siam.

Presbytis neglecta keatii Rob. and Kloss, Journ. F.M.S. Mus. IV, 1911, p. 174: Trang.

Distr.—Malay Peninsula (north) including Junk Seylon.

Pithecus femoralis rhionis (Mill.).

Presbytis rhionis Miller, Smiths. Misc. Coll., XLV, 1903, p. 64: Bintang Island.

Distr.—Bintang Island, Rhio Archipelago.

Pithecus femoralis canus (Mill.).

Presbytis cana Miller, Proc. U.S. Nat. Mus. XXXI, 1906, p. 275: Kundur Island.

Distr.—Kundur Island, Rhio Archipelago.

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flanks, the whole of the hind limb, under side and tip of the tail, and hands, white. The only grey parts are crown to upper side of tail and the outer sides of the arms. Such specimens are known to me from the low hills on both sides of Lampong Bay. The race seems to extend at least as far north as Goenoeng Soegi in the Lampongs. Some specimens are tinged with brown on the upper parts and the tail may be washed with rufous.

From Borneo I have true *chrysomelas* from Samarahan in Western Sarawak and *cruciger* (syn. *arwasca*) from Baram. The "Poch" mountain that puzzled Mr. Miller is, no doubt, the hill in western Sarawak variously known as Poi, Poe, or Poeh. For views on *cruciger* see Banks, Proc. Zool. Soc. 1930, p. 693; and Chas. and Kl., Bull. Raff. Mus. 6, 1931, p. 5.

Pithecus femoralis natunae (Thos. and Hart.).

Semnopithecus natunae Thomas and Hartert, Nov. Zool. I, 1894, p. 652: Bunguran Island.

Distr.—Bunguran Island, North Natuna Islands.

Pithecus femoralis catemanus (Lyon).

Presbytis catemana Lyon, Proc. U.S. Nat. Mus. XXXIV, 1908, p. 672: Kateman River, East Sumatra.

Distr.—Sumatra (part).

Pithecus femoralis percura (Lyon).

Presbytis percura Lyon, Proc. U. S. Nat. Mus. XXXIV, 1908, p. 671: Kompei, East Sumatra.

Distr.—Sumatra (part).

Pithecus femoralis paenulatus Chas.[1]

Pithecus femoralis paenulatus Chasen, Bull. Raffles Mus. 15, 1940, p. 75: Telok Pandji, south of Laboehanbilik, North-East Sumatra.

Distr.—Sumatra (part).

Pithecus femoralis sumatranus (Müll. and Schleg.).

Semnopithecus sumatranus Müller and Schlegel, in Temm. Verh. nat. ges. Ned. overz. bezitt., Zool. (Mamm.), 1841, pp. 61, 73, pl. 10: Mt. Ophir, north of Padang, West Sumatra.

Distr.—Sumatra (part).

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[1] **Pithecus femoralis paenulatus** subsp. nov.

Diagnosis.—A langur of the *catemanus-rhionis-canus* association but differing from, and indeed sharply contrasted with these forms by reason of its very dark upper parts which are dark drabby brown and in colour nearer to those of *natunae* than to *catemanus*, etc.

Entire underparts, whitish; whitish area on the back of the thighs, large and conspicuous as in the Rhio Island forms. A pale patch on the crown. White on the insides of the limbs extending as a thin line to wrist and ankle, but rather indistinct distally. Under side of tail paler than upper side, but only at the base is this at all well marked and even here the tail is not conspicuously bicolored. Hands and feet, black.

This race needs no comparison with any of the Malayan forms in which if there are whitish thigh patches, the back is always very pale in colour.

Type.—Adult male (skin and skull), collected at Teloek Pandji, Baroemoen River, south of Laboehanbilik, North-East Sumatra, on 14th August, 1937 by M. Boogaarts. Raffles Mus. No. 853.

Skull.—Greatest length, 95·5; basal length, 63·8; zyomatic breadth (*c*) 71·8; maxillary tooth-row with canine (crowns) 30 mm.

Pithecus femoralis batuanus (Mill.).
Presbytis batuanus Miller, Smiths. Misc. Coll. XLV, 1903, p. 65: Pinie Island, Batu Islands.
Distr.—Batu Islands, West Sumatra.

Pithecus femoralis melalophos (Raffles).
Simia melalophos Raffles, Trans. Linn. Soc. XIII, 1821, p. 245: Bencoolen, West Sumatra.
Semnopithecus flavimanus Is. Geoff., in Lesson, Cent. Zool., March, 1831, p. 109, pl. XL: *see* also Geoff. in Bélang. Voy. Indes Orient, (i), 1831, pp. 39 and 74: Sumatra, *restr.* Bencoolen.
Distr.—Sumatra (part).

Pithecus femoralis nobilis (Gray).
Semnopithecus nobilis Gray, Ann. Mag. Nat. Hist. (1), 1842, p. 256: "India", error=Sumatra, *restr.* Indrapura.
Semnopithecus ferrugineus Schleg., Mus. Pays-Bas, VII, Simiæ, 1876, p. 42: Padang, West Sumatra.
Distr.—Sumatra (part).

Pithecus femoralis fluviatilis Chas.[1]
Pithecus femoralis fluviatilis Chasen, Bull. Raff. Mus. 15, 1940, p. 76: Kampong Babat, Palembang, Sumatra.
Distr.—Sumatra (part).

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[1] **Pithecus femoralis fluviatilis** subsp. nov.

Like *P. f. melalophos* of the mountains of South-West Sumatra, but much paler in colour, the general tone of the upper parts and the outer side of the limbs buffy white, or creamy buff, not pale rufous. Back much less plentifully sprinkled with black hairs, sometimes entirely without black, and merely darkened by a drab wash. Crown, cream colour, not chestnut. Coronal tuft, smoky black: nape, and sometimes the mantle, washed with grey. Under parts, white, the tail sometimes tinged with rufous.

Type.—Adult female, skin and skull (zygomata incomplete) collected by J. J. Menden at Moearadoea, Palembang, 100 metres, on 9th June, 1934. Zool. Mus. Buitenzorg. No. 3564.

Measurements.—Head and body, 548: tail, 698 mm. (in the flesh).

Skull.—Total length, 91·5; basal length, 60·5; maxillary tooth row to front of canine (crowns), 30·4 mm.

Remarks.—Adults and immature animals of this form are from Babat on the Moesi river, west of Palembang town (and roughly the same distance south of Djambi) in the north, to Moearadoea in the south. From the flat country in the east of Palembang I have seen no specimens, nor do I know anything of the monkey inhabiting the lowlands of Djambi. To the west *fluviatilis* intergrades with *melalophus* in the foothills; in the lowlands of the south it intergrades with *fusco-murinus*.

Pithecus femoralis fusco-murinus (Ell.).

Presbytis fusco-murina Elliot, Proc. Biol. Soc. Wash. XIX, 1906, p. 49: Telok Betong, Lampongs, South Sumatra.

Distr.—Sumatra (part).

Pithecus femoralis chrysomelas (Müll.).

Semnopithecus chrysomelas Müller, Tijdschr. nat. geschied. physiol. V, 1838, p. 138: Pontianak, West Borneo.

Distr.—Borneo (part).

Pithecus femoralis cruciger (Thos.).

Semnopithecus cruciger Thomas, Ann. Mag. Nat. Hist. (6), X, 1892, p. 475: Miri, Sarawak.

Presbytis arwasca Mill., Journ. Mamm. XV, 1934, p. 126: Miri, Sarawak.

Distr.—Borneo (part).

Pithecus aygula.[1] Sunda Island Leaf Monkey.

Pithecus aygula aygula (Linn.).

Simia aygula Linn., Syst. Nat. 10th ed. 1858, p. 27: "India" =West Java.

Presbytis mitrata Eschscholtz, in Kotzeb., Reise, 1821, p. 196, pl.: Java.

Semnopithecus comatus Desmar., Mamm., Suppl., 1822, p. 533: Java.

Distr.—Java (part).

Pithecus aygula fredericae Sody.

Pithecus aygula fredericae Sody, De Tropische Natuur, XIX, 1930, p. 68 (see also Kloss, Ann. Mag. Nat. Hist. (10) VI, 1930, p. 697): Mt. Slamat, West-Central Java, 1,000 metres.

Distr.—Java (part).

Two very curious specimens from Kampong Air Gambir, apparently not far from Babat, either represent the limit of variation in *fluviatilis*, or the colour has been altered by a preserving fluid. They are white, tinged with dark grey on the upper parts; coronal tuft, black. They are paler above than *fusco-murinus* and much less darkened on the outer sides of the arms which are white with very few black hairs.

[1] *Pithecus aygula* Revision: Pocock, Proc. Zool. Soc. 1934, p. 918.

Pocock has suggested that *fredericae* is based on a skin of *pyrrhus* with which a skull of *aygula* has been associated by mistake, but this is not so and specimens I have examined confirm that the race is valid on the characters assigned to it by its describer (*see* Sody, Nat. Tijd. Ned. Ind. XC, 1930, p. 258, and P. Z. S. 1937, p. 257).

Pithecus aygula hosei (Thos.).
Semnopithecus hosei Thomas, Proc. Zool. Soc. 1889, p.159, pl. XVI; Niah, Baram, Sarawak.
Semnopithecus everetti Thos., Proc. Zool. Soc. 1892, p. 582, pl. XLI: Mt. Kinabalu, British North Borneo.
Distr.—Borneo (part).

*** Pithecus aygula canicrus (Mill.).**
Presbytis canicrus Miller, Proc. Biol. Soc. Wash, XLVII, 1934, p. 15: Dutch North-East Borneo.
Distr.—Borneo (part).

Pithecus aygula sabanus (Thos.).
Semnopithecus sabanus Thomas, Ann. Mag. Nat. Hist. (6), XII, 1893, p. 230, pl. VII: Paitan, British North Borneo.
Distr.—Borneo (part).

Pithecus aygula thomasi (Coll.).
Semnopithecus thomasi Collett, Proc. Zool. Soc. 1892, p. 613, pl. XLII: Langkat, North-East Sumatra.
Distr.—Sumatra.

Pithecus potenziani.[1] Mentawi Leaf Monkey

Pithecus potenziani potenziani (Bp.).
Semnopithecus potenziani Bonaparte, Comptes Rendus, XLIII, 1856, p. 412: Sipora Island, *Chas.* and *Kloss*, 1927.
Presbytes chrysogaster Blyth, Journ. Asiat. Soc. Beng. XLIV, pt. 2, extra number, 1875, p. 10: "Tenasserim", error = Sipora.
Distr.—Sipora and Pagi Islands, Mentawi group, West Sumatra.

Pithecus potenziani siberu Chas. and Kloss.
1927 *Pithecus potenziani siberu* Chasen and Kloss, Proc. Zool. Soc. 1917, p. 811, pl. I: Siberut Island.
Distr. Siberut Island, Mentawi group, West Sumatra.

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[1] *Pithecus potenziani.* Revision: Pocock, Proc. Zool. Soc. 1934, p. 954. This very distinct monkey, strangely isolated in the Mentawi Islands certainly shows a superficial resemblance to the Indo-Chinese *francoisi* association, but I suggest that we need not look so far afield for its nearest relations, and that its affinitives are with *aygula* of which, taking an extremely broad view, it could be regarded as a very distinct race, although in Pocock's arrangement of the Malaysian langurs it is so far removed from *hosei*, etc. that it is placed in another genus. When Kloss and I separated the Siberut form from Sipora topotypes (it would be remarkable if the two forms were not distinct) we had before us seven specimens from Sipora and five from Siberut. We characterized the new form as like *p. potenziani* but "with the rufous under parts of that form replaced by black, or dull brown", and later wrote, "separable at sight from *p. potenziani* by reason of its blackened under parts." With one old specimen from Sipora and a fresher skin from Siberut (ex. Raffles Museum), which Pocock admits "has less red and more black below" than the Sipora skin, this author adds, "the evidence that the Siberut skin is racially distinct from typical *potenziani* seems to me to be quite inconclusive"!

Pithecus obscurus.[1] Dusky Leaf Monkey.

Pithecus obscurus obscurus (Reid).

Semnopithecus Obscurus Reid, Proc. Zool. Soc. 1837, p. 14: Malay Peninsula, restr. Malacca.

Semn. leucomystax Müll. and Schleg. in Temm. Verh. Nat. Ges. Ned. 1841, p. 69: Malacca (Schleg., Mus. Pays-Bas, VII, 1876, p. 49).

Distr.—Malay States.

Pithecus obscurus flavicauda (Ell.).

Pygathrix flavicauda Elliot, Proc. U. S. Nat. Mus. XXXVIII, 1910, p. 352: Trang, Peninsular Siam.

Distr.—Peninsular Siam.

Pithecus obscurus halonifer (Cant.).

Semnopithecus halonifer Cantor, Proc. Linn. Soc. 1845, p. 235: Penang Island.

Distr.—Penang Island.

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[1] *Pithecus obscurus.* Revisions: Pocock, P.Z.S. 1934, p. 940: Chasen, Journ. Siam Soc., Nat. Hist. Suppl. X, 1935, p. 34.

P. o. obscurus occurs in the typical form in Johore, Malacca, Negri Sembilan, Selangor and Pahang (but not in Singapore Island). Except for a few specimens from some localities in the south, which are perhaps best placed with *P. o. obscurus*, animals from Perak, Kedah, Perlis, Trengganu and at least as far north as Bangnara, average slightly darker in colour and are really *P. obscurus* > *halonifer*. At about the latitude of the Isthmus of Kra *flavicauda* changes into *smithi* Kloss (Klong Bang Lai, Patiyu). Pocock has recorded a somewhat abnormal specimen from Pulau Panjang in the Junk Seylon group of islands. I have a series from the small islands off the west coast of Peninsular Siam from Koh Yam Yai in the north to Pulau Lontar in the south, composed of animals that must be placed with *flavicauda* although one very old male fom Pulau Panjang is unusual in that the cape and adjoining part of the dorsal line are very pale and almost like the cap in colour.

The arrangement adopted in this handlist is based on a series of ninety skins discussed at greater length by me in the paper quoted above. Pocock mentions a pale mutant of *P. obscurus* sent to the British Museum labelled *P. robinsoni* and concludes that it "is perhaps one of the skins cited by Robinson and Kloss as attesting great variation in the tints of *robinsoni.*" This is not so, and the specimen in question was identified as *obscurus* and discussed in detail by the authors quoted, in Journ. F.M.S. Mus. V, 1914, p. 113. Published identifications and views must take precedence over a name written on a label.

Pithecus obscurus carbo (Thos. and Wrought.).

Presbytis obscura carbo Thomas and Wroughton, Ann. Mag. Nat. Hist. (8), IV, 1909, p. 534: Terutau Island, not Langkawi as stated in the original description).

Presbytis corvus Mill., Smiths. Misc. Coll. LXI, 21, 1913, p. 27: Terutau Island.

Distr.—Terutau and Langkawi Islands, Straits of Malacca.

Pithecus obscurus styx (Kl.).

Presbytis obscura styx Kloss, Ann. Mag. Nat. Hist. (8), VII, 1911, p. 116: East Perhentian Island.

Distr.—East Perhentian Island, off Trengganu, east coast Malay Peninsula.

Pithecus obscurus seimundi Chas.[1]

Pithecus obscurus seimundi Chasen, Bull. Raffles Mus. 15, 1940, p. 80: Koh Pennan.

Distr.—Koh (Island) Pennan, Bight of Bandon, N. E. Malay Peninsula.

Pithecus rubicundus.[2] Maroon Leaf Monkey.

Pithecus rubicundus rubicundus (Müll.).

Semnopithecus rubicundus Müller, Tjidsch. nat. gesch. physiol. V, 1838, p. 137: Mt. Sekumbang, south-east of Banjermasin, South Borneo.

Distr.—Borneo (part).

Pithecus rubicundus rubidus (Lyon).

Pygathrix rubicunda rubida Lyon, Proc. U. S. Nat. Mus. XL, 1911, p. 139: mouth of Kendawangan River near south-west point of Borneo.

Distr.—Borneo (part).

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[1] **Pithecus obscurus seimundi** subsp. nov.

Upper parts very dark as in *P. o. carbo* from Terutau Island, but frontal band browner and less black. Limbs slightly paler than in *carbo* and about as in *halonifer* of Penang Island.

Type.—Adult male collected on Koh (Island) Pennan, N. E. Malay Peninsula by H. C. Robinson and E. Seimund on 25th May, 1913. F.M.S. Mus. No.*536/~~14~~. 13

For details of the series examined and measurements *see* Rob. and Kloss, Journ. F.M.S. Mus. V, 1914, p. 131.

[2] *Pithecus rubicundus.* Reviews: Chas. and Kl., Bull. Raffles Mus. 6, 1931, p. 3; Pocock, Proc. Zool. Soc. 1934 (1935), p. 923. There are, quite clearly, at least two races of this monkey in Borneo. Specimens from near Sandakan in the north of the island cannot be confused with others from West Sarawak but the ranges of the subspecies have not yet been defined in any degree of detail. I have never seen exact topotypes of *rubidus*, but regard *carimatae* as a recognizable race. No useful study of variation in this species can be based on the quite inadequate material in the British Museum.

Erratum.—Bull. Raffles Mus. 6, 1931, p. 51, skull 3243, basal length, for 70 read 60 mm.

*. 536/14 is a Mycteromys crociduroides

Pithecus rubicundus ignitus (Doll.).
Presbytis ignita Dollman, Ann. Mag. Nat. Hist. (8), IV, 1909, p. 204; Mt. Mulu, North Sarawak.
Distr.—Borneo (part).

Pithecus rubicundus carimatæ (Mill.).
Presbytis carimatae Miller, Proc. U. S. Nat. Mus. XXXI, 1906, p. 65: Karimata Island.
Distr.—Karimata Island.

Pithecus frontatus.[1] White-fronted Leaf Monkey.

Pithecus frontatus frontatus (Müll.).
Semnopithecus frontatus Müller, Tjidsch. nat. gesch. physiol. V, 1838, p. 136: South-East Borneo.
Distr.—Borneo (part).

Pithecus frontatus nudifrons (Ell.).
Presbytis nudifrons Elliot, Ann. Mag. Nat. Hist. (8), IV, 1909, p. 266: Bajalong, Central Sarawak.
Distr.—Borneo (part).

Pithecus pyrrhus.[2] Silvered Leaf Monkey.

Pithecus pyrrhus pyrrhus (Horsf.).
Semnopithecus pyrrhus Horsfield, Zool. Researches Java, 1823: Java (*restr.* Prov. of Pasuruan, East Java, *Rob. and Kloss, 1919*).
Distr.—Java (part).

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[1] *Pithecus frontatus.* Revision: Pocock, Proc. Zool. Soc. 1934 (1935), p. 926. Topotypes of the two described races are certainly distinct, but on the available material I cannot proceed further.

[2] *Pithecus pyrrhus.* Revisions: Kloss. Journ. Nat. Hist. Soc. Siam, III, 1919, p. 340; Pocock, Journ. Bomb. Nat. Hist. Soc. XXXII, 1928, p. 667; Pocock, Proc. Zool. Soc. 1934, p. 929. "*Simia ceylonica* Desmoul., Dict. Class. Hist. Nat. VII, 1825, p. 572" has been quoted as a synonym of this species. The name is not in Sherborn.

Ceropithecus auratus E. Geoff., Ann. Mus. Hist. Nat. (Paris), XIX, 1812, p. 93 may be the correct name of this species, but in view of Pocock's refusal to accept Elliot's categorical identification of the type in Paris nothing further can be done until the specimen is critically re-examined. Pocock suggests that the name is based on *P. rubicundus* juv. The specimen figured by Müller and Schlegel as *S. sumatranus* var. *aurata* (*see* spec. *e* of Jentink, Mus. Pays—Bas, 1892, p. 12) is now a wretched mounted specimen, so much faded that it is almost beyond identification. I guess it to be an example of one of the red races of *femoralis.*

Semnopithecus argentatus "Blyth", Horsf., Cat. Mamm. E. Ind. Co. 1851, p. 7 is another name of uncertain application. Elliot put it as a synonym of both *P. phayrei* and *P. siamensis*

(Mon. Prim. III, pp. 49, 59): Pocock prefers *cristatus* (P. Z. S. 1934, p. 936). This author finds that specimens of *pyrrhus* from Tjilatjap on the South coast of Java are intermediate in characters between the two Javan forms. I have a skin definitely of the typical race from Karangbolang in the same neighbourhood (long. 109° 23′ E.): hereabouts the species is, evidently, unstable. The large and correctly measured skull of *pyrrhus* mentioned in Pocock's 1934 review, p. 931, is in Singapore and it can be mentioned that when Kloss discussed *ultima* he had series in front of him of which that sent to London was only a part.

In the Raffles Museum there is a fair series of "*cristatus*" from various parts of Malaysia and a ready division into a dark section (*cristatus*, part of Sumatra and the adjacent small islands) and a pale section (*ultimus*, Sarawak, North Borneo, North Sumatra and the Malay States) is obvious at first sight. *Cristatus* is comparatively much blackened; the forearm is largely black, and the wrists and hands usually extensively so: *ultimus* is much more silvery in appearance and the black hands form a contrast with the much frosted forearms. Specimens from Borneo and the Malay Peninsula ought not to be alike and maybe more even series of adults would show that those from the latter locality have smaller bullæ and a straighter upper tooth-row, but in any case the differences are very slight. The species has a curious distribution in the Malay States and is only known from the west coast between Penang and Malacca. Specimens from North-East Sumatra are clearly referable to *ultimus* and two skins from Mt. Leuser on the north-west coast are also very much silvered on the rump, but from the rest of Sumatra, right down to the Lampongs we find the darker form. I am not thoroughly convinced that true *cristatus* and *pullatus* are rightly lumped, although it is clear that when the latter was described it was compared with Malayan examples and therefore said to be darker. Series for series the skulls of *pullatus* from the very small islands of the Rhio Archipelago strike me as representing a depauperated subspecies, but the material available is deficient in really adult males and Pocock has published the measurements of a big skull from Bintang. The type of *ultimus* is said to have come from an altitude of 3,000 ft. on Mt. Dulit, but I suspect a mistake of some sort and doubt if in that part of Borneo this monkey is anything but a mangrove and coastal species, not occurring in the inland, submontane forest. All Bornean specimens examined are from Sarawak and British North Borneo: I cannot therefore confirm that all parts of the island are occupied by *ultimus*: southern animals may be *cristatus*.

Pithecus pyrrhus sondaicus Rob. and Kl.

Pithecus pyrrhus sondaicus Robinson and Kloss, Ann. Mag. Nat. Hist. (9), IV, 1919, p. 374: Tjibodas, Preanger Regencies, West Java, 4,500 ft.

Distr.—Java (part).

Pithecus pyrrhus kohlbruggei Sody.

Pithecus pyrrhus kohlbruggei Sody, Natuur. Tijdschr. Ned. Ind. XCI, 1931, p. 349: Bali.

[*Trachypithecus pyrrhus*] *stresemanni* Pocock, Proc. Zool. Soc. 1934 (Jan. 1935), p. 931: Bali.

Distr.—Bali.

Pithecus pyrrhus cristatus (Raffl.).

Simia cristatus Raffles, Trans. Linn. Soc. XIII, 1821, p. 244: Bencoolen, West Sumatra.

Semnopithecus pruinosus Desm., Ency. Méth. (Mamm.), 1822, p. 533: Sumatra.

Presbytis cristata pullata Thos. and Wrought., Ann. Mag. Nat. Hist. (8), III, 1909, p. 439: Batam Island, Rhio Archipelago.

Distr.—Sumatra (part); Rhio and Lingga Archipelagos (Batam, Bintang, Bulan, Sugi, Galang, Sebang, Bakong, Lingga, Chombol.) Banka; Billiton (specimens from this island not examined).

Pithecus pyrrhus ultimus (Ell.).

Pygathrix ultima Elliott, Proc. U. S. Nat. Mus. XXXVIII, 1910, p. 351: Mt. Dulit, Sarawak.

Distr.—Malay States; Sumatra (pt.); Borneo.

Pithecus pyrrhus vigilans (Mill.).

Presbytis vigilans Miller, Proc. Wash. Sci. LXI, 21, 1913, p. 29: Sirhassen Island.

Distr.—Sirhassen Island, South Natuna Islands.

Genus NASALIS E. Geoffroy, 1812.

Nasalis larvatus. Proboscis Monkey.

Nasalis larvatus larvatus (Wurmb).

Cercophitecus (sic) *larvatus* van Wurmb, Verhand. Batav. Genootsch. 1st ed. III, 1781, pp. 345–354 (name on p. 353); 2nd ed. III, 1824, pp. 217–222 (name on p. 228): Pontianak, West Borneo.

Simia (Cercop.) capistratus Kerr, Anim. King. 1792, p. 73: Borneo.[1]

Cercopithecus nasica Lacépède, Tabl. Mamm. 1799, p. 4: Borneo.

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[1] The references to *capistratus* and *nasica* are taken from Sherborn. *Nasalis recurvus* was based on a specimen brought from Borneo by a collector who had been sent to that island by Sir Stamford Raffles during his residence at Bencoolen. No type locality is mentioned but the probability is very strongly in favour of Pontianak or Sambas. Raffles while at Bencoolen was much interested in Dutch activities in the west of Borneo and it is unlikely that he would have sent collectors to Banjermasin (or beyond) which was very much in the Dutch area as taken over after the Peace. Raffles was far from being *persona grata* with the Dutch and even natural history collectors would have been regarded with the utmost suspicion.

Nasalis recurvus Vig. and Horsf., Journ. Zool. IV, 1828, p. 110; Pontianak.
Distr.—Borneo (part).

Nasalis larvatus orientalis Chas.[1]
Nasalis larvatus orientalis Chasen, Bull. Raff. Mus. 15, 1940, p. 84: Bulungan, North-East Borneo.
Distr.—Borneo (part).

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[1] **Nasalis larvatus orientalis** subsp. nov.

Like *N. l. larvatus* (adults of both sexes) from Pontianak, but the cap and nuchal stripe much less sharply defined; the nuchal stripe obsolete. The remaining upper parts much paler than in *larvatus*, and also more uniform, there being little grizzling on the fore part of the back. Under parts more deeply and uniformly ferruginous.

Type.—Adult male (skin and skull), collected at Salim Batu, Bulungan, Dutch North-East Borneo, on 26th October, 1935 by Baron Victor von Plessen. Museum Buitenzorg No. 3532.

External measurements.—Total length, 1443; tail, 720; ear, 35; hind foot, 237 mm. (coll. measurements).

Skull.—Greatest length, 139; basal length, 96·1; greatest width, 92·4; upper tooth-row with canine, 40 mm.

Remarks.—Thirty-nine skins and skulls, the majority kindly lent by the custodians of the Buitenzorg and Sarawak Museums are available for comparison from near Kuching, West Sarawak (2 ad. ♂, 2 ad. ♀, 1 imm. ♂); "Sarawak" (1 ad. ♂, 2 ad. ♀, 2 juv.); the Trusan river, North Sarawak (3 ad. ♂, 3 ad. ♀, 1 imm. ♂); near Pontianak, W. Borneo (3 ad. ♂, 4 ad. ♀, 2 subad. ♂, 1 juv.); near Kotawaringin, S.W. Borneo (3 ad. ♂); Sampit, S. Borneo (1 ad. ♂, 2 ad. ♀, 1 juv.); Samarinda (1 ♀); Bulangan (1 ad. ♂, 1 subad. ♂, 1 ad. ♀); "British North Borneo" (1 imm. ♂).

As was to be expected, for all except one species of the Bornean langurs have been shown to vary geographically, it is at once obvious that more than one race exists. The most striking distinction is between animals from the two most remote points, geographically. Fortunately, one of these, Pontianak in West Borneo is the nominal type locality of the species: the other is Bulungan in N. E. Borneo. In this place I cannot do more than make a very broad survey of the material and will not discuss changes in colour due to age, or the skulls.

The adult males from near Pontianak have the dark cap and nuchal stripe very sharply defined against the pinkish buff remainder of the head and neck. The lower back, deep cinnamon-rufous or sienna, is much more richly coloured than the fore part of the back and shoulders which are browner, less red, and much grizzled. The under parts vary from cream-colour

Genus SIMIAS Miller, 1903.

Simias concolor. Pig-tailed Langur.

Simias concolor concolor Mill.

Simias concolor Miller, Smiths. Misc. Coll. XLV, 1903, p. 67, pls. XIV, XV, XVI: South Pagi Island.

Distr.—Islands of South Pagi and Sipora, Mentawi Islands, West Sumatra.

Simias concolor siberu Chas. and Kl.

Simias concolor siberu Chasen and Kloss, Proc. Zool. Soc. 1927, p. 813, pl. II: Siberut Island.

Distr.—Siberut Island, Mentawi Islands, West Sumatra.

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to cream-buff, but the throat is pale ferruginous and fairly well defined against the breast. Females show the same broad characters, but less decisively, especially as regards the two zones on the back, although it can still be said that the dark grizzling is mostly on the anterior half, and the lower back is brightest. For the present, animals from Kotawaringin, Sampit and Samarinda must be placed with the typical race.

The adult male from Bulangan is very different. Were not its characters adumbrated in a female and a subadult male from the same locality I should have regarded it as an aberration. It differs from topotypical males of *larvatus* in that the cap and nuchal stripe are much less sharply defined: the nuchal stripe is obsolete. The head and neck are therefore more uniformly coloured; the crown is much paler and more cinnamon and less chocolate in colour.

The back is lighter in colour, almost uniformly orange-cinnamon, and with the grizzled brown area on the fore part of the back much restricted. The under parts are more deeply and evenly rufous and the centre of the abdomen is almost as deeply coloured as the rufous throat.

An adult female from Bulangan is much paler, yellower and less red on the upper parts than in any example of this sex in the typical race.

Males from the vicinity of Kuching in Sarawak are best put with the typical race, although the abdomen is sometimes more rufous than in any topotype examined. Specimens from the Trusan basin at the other end of Sarawak are nearer to *orientalis* than to *larvatus*, but they are somewhat intermediate, having pale, rather uniform backs, pale under parts, and caps and nape bands slightly more decisive than in *orientalis*. Of three Trusan females one is clearly *orientalis:* the other two are browner and darker, but they are still much less richly coloured and red than females of *larvatus*.

Family TARSIIDÆ

Genus TARSIUS Storr, 1780.

Tarsius tarsier.[1] Tarsier.

[**Tarsius tarsier tarsier** (Erxl.).

Lemur Tarsier Erxleben, Syst. Anim. 1777, p. 71: Philippine Islands.

Distr.—Extralimital.]

* **Tarsius tarsier bancanus** Horsf.

Tarsius bancanus Horsfield, Zool. Researches Java (2), 1821, plate: Banka Island.

Distr.—Sumatra; Banka.

* **Tarsius tarsier saltator** Ell.

Tarsius saltator Elliot, Bull. Amer. Mus. Nat. Hist. XXVIII, 1910, p. 152: Billiton Island.

Distr.—Billiton.

Tarsius tarsier borneanus Ell.

Tarsius borneanus Elliott, Bull. Amer. Mus. Nat. Hist. XXVIII, 1910, p. 153; Landak River, Dutch West Borneo.

Distr.—Borneo.

Tarsius tarsier natunensis Chas.[2]

Tarsius tarsier natunensis Bull. Raffles Mus., 15, 1940, p. 40: Sirhassen Island.

Distr.—Sirhassen, South Natuna Islands.

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[1] *Tarsius tarsier.* Elliot contends that this name is indeterminable but admits that it applies to one of the Philippine forms, all now known by names later than 1894.

[2] **Tarsius tarsier natunensis** subsp. nov.

Tarsius bancanus Chasen (*nec* Horsf.), Bull. Raff. Mus. 10, 1935, p. 9: Sirhassen.

Type.—Adult male (skin and skull), collected on Sirhassen Island, South Natuna Islands, China Sea, on 16th August, 1931, by P. M. de Fontaine.

Characters.—The smallest known race. In colour like *T. t. saltator* on the upper parts, but rather darker below as in *T. t. borneanus.* The skull is unique among a series of adult skulls of *saltator* and *borneanus* on account of the narrow and less inflated condition of the anterior lobe of the audital bulla. Muzzle rounded as in *borneanus.* Distribution of hair on feet and tail as in the other purely Malaysian subspecies.

Colour.—Colder and paler, more olive and less brownish in tone, especially on the crown, shoulders and flanks, than any of a dozen skins from Sarawak, which include specimens collected as recently as 1932. Under parts as in *borneanus:* breast and abdomen chiefly grey, the hairs finely tipped with buff, or cream colour.

Measurements.—The following measurements are approximate and computed from the skin, compared with Bornean skins with accurate flesh measurements. Head and body, 140; tail, 202; hind foot, 62 mm.

Skull.—Greatest length, 36·7; occipito-nasal length, 34·8; front of *pmx.* to front of foramen magnum, 26·5; front of *pmx.* to posterior extremity of palate, 15·4; greatest length of bullæ diagonally, 11·7; greatest biorbital breadth between emarginations, 28·3; greatest breadth of skull, 32; breadth of braincase, 22, greatest length of upper molar row, 12·2; length of mandible, 24·4 mm.

Remarks.—The only Malaysian race of *Tarsius* at all well known is the Bornean *T. t. borneanus* of which a dozen skins from Sarawak have the fur very richly coloured and showing much rufous and golden buff on the upper parts. On the under parts the prevailing tone of the breast and abdomen is dark grey, although the hairs are actually finely tipped with buff or cream. The prevailing colour of the throat and upper chest in well prepared skins is usually rusty buff. The genital region and a broad stripe on the inside of each thigh are white, or whitish buff. The external measurements as recorded by various authors and by collectors on labels seem rather too variable for detailed use and possibly indicate more than one method of measuring. Ten adult skulls from Sarawak give the following measurements.—Greatest length, 38·3–40·5 (38·9); greatest width (orbital), 33·8–35·5 (34·8); greatest width of braincase, 22·4–23·9 (23·4); upper molar row, 12·2–13·4 (12·5) mm.

T. t. bancanus was a very imperfectly known form until H. J. V. Sody (Temminckia, 2, 1937, p. 247) described two adults. These have skulls a trifle shorter than in *borneanus* and the skins are whiter on the under parts. According to this author Sumatran animals must, for the present, be referred to *bancanus*. I have never examined a specimen of this form, the type locality of which is not Java, as Elliot supposed, but the island of Banka (Rob. and Kloss, Journ. F.M.S. Mus. VII, 1919, p. 259).

T. t. salvator from Billiton also has a slightly smaller skull than *borneanus*. Fourteen skins and skulls kindly lent by Dr. K. W. Dammerman are available for study. The four largest skulls of the aged animals give the following measurements.—greatest length, 37–38·7; greatest width (orbital), 32·9–34·1; greatest width of braincase, 23·1–24; upper molar row, 11·8–12·4 mm.

The skins are very variable in general colour and there is a very marked difference between the two extremes, the general tone of the upper parts in one animal being grey and in the other, olive-buff with the lower back and thighs almost creamy. The series is much less brown on the upper parts, and rather paler on the under parts than in Sarawak skins and on the material before me the races can be easily separated on colour alone.

When even series of skulls are compared, using only aged animals in which the posterior rim of the orbit is much expanded, the shape of the bullæ and the size of the molars are seen to be very variable in both races, but the Billiton skulls, seen from above, can be picked out by the more pointed, less square or rounded, muzzles. I cannot appreciate any character of the mandible that will distinguish between the two races.

There is no reliable record of *Tarsius* from Java.

Family LORISIDÆ.

Genus NYCTICEBUS E. Geoffroy, 1812.[1]

Nycticebus coucang. Slow Loris.

Nycticebus coucang coucang (Bodd.).

Tardigradus coucang Boddaert, Elench. Animal, 1785, p. 67: probably Malacca.

Semnopithecus buku Martin, Ann. Mag. Nat. Hist. (4), II, 1838, p. 435: Sumatra.

Nycticebus tardigradus var *malaiana* And., Cat. Mamm. Ind. Mus. I, 1881, p. 95: Malacca.

Distr.—Malay Peninsula; Sumatra (part).

Nycticebus coucang insularis Rob.

Nycticebus coucang insularis Robinson, Journ. F. M. S. Mus. VII, 1917, p. 101, Tioman Island.

Distr.—Tioman Island, off Johore, east coast Malay Peninsula.

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[1] *Nycticebus.* Revisions: Stone and Rehn, Proc. Acad. Sci. Phild. LIV, 1902, p. 138; Lyon, Proc. U.S. Nat. Mus. XXXI, 1906, p. 527; *see* also Thos., Journ. Bomb. Nat. Hist. Soc. XXVIII, 1922, p. 433; and Ann. Mag. Nat. Hist. (9), VIII, 1921, p. 627. The Raffles Museum series is reviewed in Bull. Raffles Mus. 10, 1935, p. 8.

It has not yet been shown that two forms exist in Java and Horsfield's "Java" specimen probably came from Sumatra. *N.c. coucang* occurs on the coastal islands of Junk Seylon, Penang, Singapore, and the small islets near Singapore. The northern form, *N.c. cinereus* M. Eds. is recorded from as far south as Koh Lak in S.W. Siam and it may, therefore, enter the northern part of our area. *Nycticebus* is said to occur in the Anamba Islands.

*** Nycticebus coucang hilleri Stone and Rehn.**
Nycticebus coucang hilleri Stone and Rehn, Proc. Acad. Nat. Sci. Phild. LIV, 1902, p. 139: Padang Highlands, Sumatra.
Nycticebus Sumatrensis Ludek., Geneesk. Tijdschr. Ned. Ind. (9) N.S. 4, 1862, p. 41: Sumatra (*nom. nud.*).
Distr.—Sumatra (part).

Nycticebus coucang bancanus Lyon.
Nycticebus bancanus Lyon, Proc. U. S. Nat. Mus. XXXI, 1906, p. 536: Banka Island.
Distr.—Banka Island; Batam and Galang Islands, Rhio Archipelago.

Nycticebus coucang borneanus Lyon.
Nycticebus borneanus Lyon, Proc. U.S. Nat. Mus. XXXI, 1906, p. 535: Sakaian River, Sangau District, Dutch West Borneo.
Distr.—Borneo.

Nycticebus coucang natunæ Stone and Rehn.
Nycticebus coucang natunae Stone and Rehn, Proc. Acad. Nat. Sci. Phild. LIV, 1902, p. 140: Bunguran Island.
Distr.—Bunguran Island, North Natuna Islands.

Nycticebus coucang javanicus E. Geoff.
Nycticebus javanicus E. Geoff., Ann. Mus. H.N. (Paris), XIX, 1812 p. 164; Java.
Nycticebus ornatus Thos., Ann. Mag. Nat. Hist. (9), VIII, 1921, p. 627: Batavia, West Java.
Distr.—Java.

Order CARNIVORA

Family URSIDÆ.

Genus HELARCTOS Horsfield, 1825.

Helarctos malayanus.[1] Malay Bear.

Helarctos malayanus malayanus (Raffles).
Ursus malayanus Raffles, Trans. Linn. Soc. XIII, 1821, p. 254: Sumatra.
Distr.—Malay Peninsula; Sumatra; ? Banka.

Helarctos malayanus euryspilus Horsf.
Helarctos euryspilus Horsfield, Zool. Journ. II, 1825, p. 221: Borneo.
Distr.—Borneo.

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[1] *Helarctos.* Revision: Pocock, Journ. Bomb. Nat. Hist. Soc. XXXVI, 1932, p. 131 (wherein Java is erroneously included in the range of this bear). The locality Banka is rather doubtful. The Bornean race must be recognized. Sex for sex the skulls of *euryspilus* do not attain the maxima of *malayanus.*

Family MUSTELIDÆ.

Genus MARTES Pinel, 1792.[1]

Martes flavigula. Yellow-throated Marten.

[**Martes flavigula flavigula** (Bodd.).
Mustela flavigula Boddaert, Elench. 1785, p. 88: Nepal.
Distr.—Extralimital.]

Martes flavigula peninsularis Bonh.
Martes flavigula peninsularis Bonhote, Ann. Mag. Nat. Hist. (7), VII, 1901, p. 346: Bankachon, Victoria Point, Tenasserim.
Distr.—Malay Peninsula.

Martes flavigula henrici (Schinz).
Mustela henrici Schinz, Syst. Verz. Säug. II, 1845, Nachtr. 36: Sumatra.
Mustela lasiotis (Temm. M.S.), Jent., Cat. Mamm. Mus. Pays-Bas, 1892, p. 140: Padang, Sumatra (*nom. nud.*).
Distr.—Sumatra; Banka; Borneo (part).

Martes flavigula saba Chas. and Kl.
Martes flavigula saba Chasen and Kloss, Bull. Raffles Mus. VI, 1932, p. 13: near Sandakan, British North Borneo.
Distr.—Borneo (part).

Martes flavigula robinsoni (Pocock).
Lamprogale flavigula robinsoni Pocock, Ann. Mag. Nat. Hist. (10) XVII, 1936, p. 403: Tjibodas, Java.
Distr.—Java.

Genus MUSTELA Linn., 1758.

Mustela lutreolina Rob. and Thos. Java Weasel.
Mustela lutreolina Robinson and Thomas, Ann. Mag. Nat. Hist. (8), XX, 1917, p. 261: Tjibodas, West Java, 5,500 ft.
Distr.—Java.

Mustela nudipes.[2] Weasel.

Mustela nudipes nudipes F. Cuv.
Mustela nudipes F. Cuvier, in E. Geoffroy St. H. and F. Cuv., Hist. Nat. Mamm. II, (32), 1821, Furet de Java, p. 2: West Sumatra (*Rob.* and *Kl.* 1919).
Distr.—Sumatra.

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[1] *Martes flavigula.* Revision: Pocock, Proc. Zool. Soc. 1936, p. 531. By some authors this species is separated from the non-tropical martens and put into another genus, *Lamprogale.* The original reference to *M. henrici* given above is taken from Sherborn. Sody (1937) considers that *henrici* extends to *South* Borneo.

[2] *Mustela nudipes. See* Rob. and Kloss, Journ. F.M.S. Mus. VII, 1919, p. 304; and Chas. and Kloss, Bull. Raff. Mus. 6, 1931, p. 14.

Mustela nudipes leucocephala (Gray).

Gymnopus leucocephalus J. E. Gray, Proc. Zool. Soc. 1865, p. 119: Borneo.

Distr.—Malay States; Borneo.

Genus HELICTIS Gray, 1831.

Helictis orientalis. Ferret-Badger.

Helictis orientalis orientalis (Horsf.).

Gulo orientalis Horsfield, Zool. Researches Java, 1821, East Java.

Mydaus maccourus Temm., Mon. Mamm. I, 1824, p. xx: *nom. nov.* for *G. orientalis.*

Distr.—Java (part).

* **Helictis orientalis sundaicus Sody.**

Helictis orientalis sundaicus Sody, Temminckia, 1937, p. 211: Gunong Salak, West Java.

Distr.—Java (part).

Helictis orientalis everetti Thos.

Helictis everetti Thomas, Ann. Mag. Nat. Hist. (6), 15, 1895, p. 331: Mt. Kinabalu, North Borneo, 4,000 ft.

Distr.—Borneo.

Genus ARCTONYX F. Cuvier, 1825.

Arctonyx collaris. Hog-nosed Badger.

[**Arctonyx collaris collaris F. Cuv.**

Arctonyx collaris F. Cuvier in E. Geoff. St. H. and F. Cuv., Hist. Nat. Mamm. III, 1825, pt. 51, pl. and text: Eastern Himalayas.

Distr.—Extralimital.]

Arctonyx collaris hoevenii (Hubr.).

Trichomanis hoevenii Hubrecht, Notes Leyd. Mus. XIII, 1891, p. 241: Mountains between Palembang and Bencoolen, Sumatra.

Distr.—Sumatra.

Arctonyx collaris dictator Thos.[1]

Arctonyx dictator Thomas, Ann. Mag. Nat. Hist. (8), V, 1910, p. 424: Lamra, Trang, Peninsular Siam.

Distr.—Peninsular Siam.

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[1] *Arctonyx dictator.* This species is well known to occur in Upper Perak but no specimen has yet been obtained.

Genus MYDAUS F. Cuvier, 1821.

Mydaus javanensis.[1] Teledu.

Mydaus javanensis javanensis (Lesch.).

Mephitis javanensis Leschenault, N. Dict. H. N. ed. 2, XXI, 1818, p. 520: Java.

Mydaus meliceps F. Cuv., in E. Geoff. St. H. and F. Cuv., Hist. Nat. Mamm. II, 1821, Telagon, p. 2: Java.

Distr.—Sumatra; Java.

Mydaus javanensis lucifer Thos.

Mydaus lucifer Thomas, Ann. Mag. Nat. Hist. (7), IX, 1902, p. 442: Bornean mainland opposite Labuan Island.

Mydaus javanensis montanus Moulton, Journ. Straits Br. Roy. Asiat. Soc. No. 83, 1921, p. 142: Kalabit country, N.E. Sarawak.

Mydaus luciferoides Loenn. and Mjoeb., Ann. Mag. Nat. Hist. (9), XVI, 1925, p. 509: Kalabit country, N.E. Sarawak.

Distr.—Borneo.

Mydaus javanensis ollula Thos.

Mydaus ollula Thomas, Ann. Mag. Nat. Hist. (7), IX, 1902, p. 443: Bunguran (Gt. Natuna) Island.

Distr.—Bunguran Island, North Natuna Islands.

Genus LUTRA Brisson, 1762.[2]

Lutra lutra. Common Otter.

[**Lutra lutra lutra (Linn.).**

Mustela lutra Linn., Syst. Nat., ed. 10, 1758 p. 45: Europe.

Distr.—Extralimital.]

Lutra lutra barang Cuv.[3]

Lutra barang F. Cuvier, Dict. Sc. Nat. XXVII, 1823, p. 246: Sumatra.

Distr.—Sumatra; Java.

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[1] *Mydaus.* *See* Jacobson, Journ. F.M.S. Mus. X, 1921, p. 236; Thos., Ann. Mag. Nat. Hist. (9), XX, 1927, p. 288; and Kloss, Journ. Malay. Br. Roy. Asiat. Soc. V, 1927, p. 349.

The original reference to *javanensis* given above is taken from Sherborn.

[2] *Lutrinae.* Revision: Pohle, Arch. f. Naturgesch. 85, sect. A, No. 9, 1920, pp. 1–246: the descriptions of two new forms appear in this paper, *L. brunnea* from Borneo and *L. intermedia* from Sumatra. *Brunnea* (near Pontianak) is available for a Bornean race of *sumatrana*, if different from *lowii: intermedia* is probably the same as *barang*, but I have not seen the types; *see* also Thos., Proc. Zool. Soc. 1889, p. 190. For the genus splitter *Micraonyx* Allen, 1919 is available for *L. cinerea.*

[3] *Lutra l. barang.* Although said to come from Java whence there is no certain record of this species, Sumatra seems a better choice for the type locality. I have accepted the convenient decision that the type of *barang*, which I have not seen, belongs to this species, and not to *simung.*

Lutra perspicillata Is. Geoff.[1] Smooth Otter.

Lutra perspicillata Is. Geoff., Dict. cl. d'Hist. Nat. IX, 1826, p. 519: Sumatra.

Lutra simung Lesson, Man. Mamm. 1827, p. 156: Sumatra.

Distr.—Malay Peninsula; Sumatra.

Lutra sumatrana (Gray). Hairy-nosed Otter.

Barangia sumatrana J. E. Gray, Proc. Zool. Soc. 1865, p. 123: Sumatra.

Lutra lovii (sic, error for *lowii*), Günth., Proc. Zool. Soc. 1876, p. 736: Borneo, opposite Labuan Island.

Distr.—Malay States; Sumatra; Banka; Borneo.

Lutra cinerea Ill. Small-clawed Otter.

Lutra cinerea J. K. W. Illiger, Abh. Ak. Wiss. (Berlin), 1804–1811 (1815), pp. 90, 99: near Batavia, West Java.

Lutra leptonyx Horsf., Zool. Researches Java, 1823: Java.

Aonyx horsfieldii Gray, Ann. Mag. Nat. Hist. XI, 1843, p. 119: Java.

Amblonyx cinerea wurmbi Sody, Ann. Mag. Nat. Hist. (10), XII, 1933, p. 441: Watangan Mts. near Poeger, Besoeki, East Java.

Distr.—Malay Peninsula; Sumatra; Rhio-Lingga Arch.; Borneo; Java.

Family CANIDÆ.

Genus CUON Hodgson, 1838.

Cuon javanicus.[2] Malay Wild Dog.

Cuon javanicus javanicus (Desm.).[3]

Canis javanicus Desmarest, Ency. Méth. (Mamm.), 1820, p. 198: Java.

Canis rutilans S. Müll. in Temm., Verh. nat. ges. Ned. overz. bezitt., Zool. 1839, pp. 27, 51: Java.

Distr.—Java.

Cuon javanicus sumatrensis (Hardw.).

Canis familiaris var. *sumatrensis* Hardwicke, Trans. Linn. Soc. XIII, 1821, p. 235: Sumatra.

Distr.—Malay Peninsula; Sumatra.

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[1] *Lutra perspicillata.* Mr. R. I. Pocock has very kindly sent this reference and information. Has also appeared in local literature under the names of *macrodus* and *tarayensis.*

[2] *Canis familiaris* var. *tenggerana* Kohl., Nat. Tijd. Ned. Ind. 1896, LV, p. 283 is a name based on a feral dog from Mt. Tengger, East Java. *See* Jentink, Notes Leyd Mus. XVIII, 1897, p. 217.

[3] *Cuon javanicus.* Review: Pocock, Proc. Zool. Soc. 1936, p. 33; *see* also Sody, Proc. Zool. Soc. 1937, p. 257. In spite of the assertions of Hose and others that this species occurs in Borneo (Hose records having seen two feeding on a wild pig), Mr. E. Banks and I believe that the records are based on village dogs run wild. The hill people of the Malayan mountains keep dogs and these often bear a very close resemblance to *Cuon,* as do some pariah dogs in rural Singapore and other Malayan localities.

Family VIVERRIDÆ.

Genus PRIONODON Horsfield, 1822.[1]

Prionodon linsang. Linsang.

Prionodon linsang linsang (Hardw.).
Viverra ? linsang Hardwicke, Trans. Linn. Soc. XIII, 1821, p. 236, p. xxiv: Malacca.
Distr.—Malay States: Sumatra.

*** Prionodon linsang fredericae Sody.**
Prionodon linsang fredericae Sody, Natuur. Tijds. XCVI, 1936, p. 43: Banka.
Distr.—Banka Island.

Prionodon linsang gracilis (Horsf.).
Felis gracilis Horsfield, Zool. Researches Java, 1821, pl.: East Java.
Viverra hardwichii Less., Mon. Mamm. 1827, p. 172: Java.
Distr.—Java; Borneo.

Genus VIVERRA Linn., 1758.[2]

Viverra zibetha. Large Indian Civet.

[**Viverra zibetha zibetha Linn.**
Viverra zibetha Linn., Syst. Nat. ed. 10, 1758, p. 44: Bengal (*Thos.*, 1911).
Distr.—Extralimital.]

Viverra zibetha sigillata Rob. and Kl.
Viverra zibetha sigillata Robinson and Kloss, Rec. Ind. Mus. XIX, 1920, p. 176: Bangnara, Patani, Peninsular Siam.
Distr.—Malay Peninsula.

Viverra tangalunga. Malay Civet.

Viverra tangalunga tangalunga Gray.
Viverra Tangalunga Gray, Proc. Zool. Soc. 1832, p. 63: West Sumatra.
Distr.—Malay States; Sumatra; Rhio-Lingga Arch. (Bintang, Kundur, Lingga); Banka; Borneo; Karimata Island.

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[1] *Prionodon linsang.* Review: Pocock, Proc. Zool. Soc. 1933, p. 970. I have seen so few of these rare animals that I accept the conventional arrangement of the races without criticism.

[2] *Viverra.* Review: Pocock, Journ. Bombay Nat. Hist. Soc. XXXVI, 1933, p. 424; Rob. and Kloss, Rec. Ind. Mus. XIX, 1920, p. 175. On the distinctness of *pruinosa* and *sigillata* see Chas., Journ. Siam Soc., Nat. Hist. Suppl. X, 1935, p. 40. *Moschothera* Pocock, 1933 is a genus available for *megaspila* and its South Indian representative, *civettina*, if it is desired to remove these from *Viverra*. *V. megaspila* has been recorded from Sumatra, but I cannot trace a reliable record,

Viverra tangalunga lancavensis Rob. and Kl.
Viverra tangalunga lancavensis Robinson and Kloss, Rec. Ind. Mus. XIX, 1920, p. 177: Langkawi Island.
Distr.—Langkawi Island, Straits of Malacca.

Viverra megaspila. Burma Civet.

Viverra megaspila megaspila Blyth.
Viverra megaspila Blyth, Journ. Asiat. Soc. Bengal, XXXI, 1862, p. 331: Prome, Lower Burma.
Distr.—Malay States.

Genus VIVERRICULA Hodgson, 1838.[1]

Viverricula malaccensis. Little Civet.

Viverricula malaccensis malaccensis (Gmel.).
Viverra malaccensis Gmelin, in Linn. Syst. Nat. 1788, p. 92: Malacca.
Viverricula malaccensis atchinensis Sody, Natuur. Tijds. Ned. Ind. XCI, 1931, p. 351: Peureula, East Atjeh, North Sumatra.
Viverricula indica klossi Pocock, Journ. Bomb. Nat. Hist. Soc. XXXVI, 1933, p. 654: Penang Island.
Distr.—Malay Peninsula; Sumatra.

Viverricula malaccensis rasse (Horsf.).
Viverra rasse Horsfield, Zool. Researches, Java (6), 1823, pl. and text: Java.
Viverricula malaccensis muriavensis Sody, Natuur. Tijdschr. Ned. Ind. XCI, 1931, p. 353: Gunong Moeria, north coast of Mid-Java.
Distr.—Java; Kangean Island.

* **Viverricula malaccensis baliensis Sody.**
Viverricula malaccensis baliensis Sody, Natuur. Tijdschr. Ned. Ind. XCI, 1931, p. 353; Bali.
Distr.—Bali.

Genus PARADOXURUS F. Cuvier and Geoffroy St. Hilaire, 1821.[2]

Paradoxurus hermaphroditus. Palm Civet; Musang.

[**Paradoxurus hermaphroditus hermaphroditus (Pall.).**
Viverra hermaphrodita Pallas in Schreber, Säugeth. III, 1777, p. 426: India.
Distr.—Extralimital.]

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[1] *Viverricula.* Review: Pocock, Journ. Bombay Nat. Hist. Soc. XXXVI, 1933, p. 629; on the specific name *see* also Chas., Journ. Siam Soc., Nat. Hist. Suppl. X, 1935, p. 41.

[2] *Paradoxurus.* Review: Pocock, Journ. Bomb. Nat. Hist. Soc. XXXVI, 1933, p. 867; XXXVII, 1934, p. 172: Proc. Zool. Soc. 1934, p. 613.

Widely different views have been taken of the status of *minor:* Bonhote held it to be a species occurring side by side with a form of *hermaphroditus.* Kloss subscribed to this view

Paradoxurus hermaphroditus musanga (Raffles).

Viverra Musanga Raffles, Trans. Linn. Soc. XIII, 1821, p. 252: Sumatra.

Paradoxurus typus Sumatranus Fischer, Syn. Mamm. 1829, p. 159: Sumatra.

Paradoxurus musangoides Gray, Mag. Nat. Hist., n.s. i, 1837, p. 579: Sumatra.

Paradoxurus brunneipes Mill., Proc., U.S. Nat. Mus. XXXI, 1906, p. 269: Kundur Island.

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and described a subspecies of *minor:* Pocock gives *minor* the nominal rank of a subspecies, which he allows to permeate large tracts of country occupied by several other subspecies in the Malay Peninsula, Siam, Burma and Annam.

My own view is that *minor,* as such, has no real existence, but owing to priority the name can be used for a subspecies of *hermaphroditus.* I have seen the type of *minor* and several specimens more or less like it from the Malay States. One of the latter is before me now and it is clearly abnormal. Although the teeth are worn down to the roots and the basi-occipital suture is closed there is the retarded development of the cranial ridges similar to that shown in the type. There is not a great deal of difference between specimens from Peninsular Siam and from the south of the Malay Peninsula, but the former average paler in colour and, curiously enough, rather smaller in size. Skins from Bangnara in Patani belong to this northern race and the use of *minor* for it therefore seems unobjectionable. I have specimens from the extreme south of Tenasserin. Whether or not *minor* differ from *cochinensis* I cannot say.

In the Malay States I find that buffy animals are usually immature, or subadult, although juveniles are grey. I cannot correlate any particular feature of the very variable colour pattern with the smallest skulls. Making a careful selection of skulls from the Malay States, with heavy crests, the basi-occipital suture closed and the dentition complete and worn, we get the following ranges from specimens in the Singapore Museum (the total length is given first and the condylo-basal length in brackets).—*males,* 104–118·5 (103·5–115); females, 105–114·1 (103·5–112·2) which gives a total length of 104–118·5 mm. for the subspecies. For *minor* a fair range seems 100–112 (97–108) mm., but the specimens examined are far fewer and the series contain fewer really aged animals than the series of *musanga.*

Cantor's localities are not always reliable and some of his specimens labelled "Penang" are almost certainly from the adjacent mainland. At any rate I cannot see any difference between three skins from Penang and others from the Malay States; the Penang skulls give measurements of 111–113 (109–110) mm.

Paradoxurus padangus Lyon, Proc. U.S. Nat. Mus. XXXIV, 1908, p. 655: Padang Island, East Sumatra.

Paradoxurus hermaphroditus simplex Mill., Smiths. Misc. Coll. LXI, 1913, p. 6: Banka Island.

Paradoxurus hermaphroditus cantori Pocock, Proc. Zool. Soc. 1934, p. 635: Penang Island.

Distr.—Malay States with Penang and Singapore Islands; Batam and Kundur Islands, Rhio Archipelago; Banka; Sumatra and the East Sumatran coastal islands; ? Siantan Island, Anamba Islands (*subsp. incert.*).

Paradoxurus hermaphroditus minor Bonh.

Paradoxurus minor Bonhote, Fasc. Malay., Zool. i, 1903, p. 8, Jalor, Peninsular Siam.

Paradoxurus ravus Mill., Smiths. Misc. Coll. LXI, 1913, p. 21: Trang, Peninsular Siam.

Distr.—Peninsular Siam; west coastal islands of Junk Seylon, Panjang and Lontar; east coast island of Koh Pennan; ? Langkawi Island (*subsp. incert.*).

Paradoxurus hermaphroditus canus Mill.

Paradoxurus hermaphroditus canus Miller, Smiths. Misc. Coll. No. 21, 1913, p. 5: Terutau Island.

Distr.—Terutau Island, Straits of Malacca.

Paradoxurus hermaphroditus milleri Kl.

Paradoxurus (hermaphroditus) milleri Kloss, Journ. Fed. Malay States Mus. II, 1908, p. 143: Tioman Island.

Distr.—Tioman Island, east coast Pahang, Malay Peninsula.

*** Paradoxurus hermaphroditus canescens Lyon.**

Paradoxurus canescens Lyon, Proc. U.S. Nat. Mus. XXXI, 1906, p. 597: Billiton Island.

Distr.—Billiton Island.

Paradoxurus hermaphroditus parvus Mill.

Paradoxurus parvus Miller, Smiths. Misc. Coll. LXI, No. 21, 1913, p. 1: Simalur Island.

Distr.—Simalur Island, West Sumatra.

Paradoxurus hermaphroditus siberu Chas. and Kloss.

Paradoxurus hermaphroditus siberu Chasen and Kloss, Proc. Zool. Soc. 1927, p. 817: Siberut Island.

Distr.—Siberut Island, West Sumatra.

Paradoxurus hermaphroditus lignicolor Mill.

Paradoxurus lignicolor Miller, Smiths. Misc. Coll. XLV, 1903, p. 44: North Pagi Island.

Distr.—Pagi and Sipora Islands, West Sumatra.

*** Paradoxurus hermaphroditus enganus Lyon.**

Paradoxurus hermaphroditus enganus Lyon, Proc. U. S. Nat. Mus. LII, 1916, p. 442: Engano Island.

Distr.—Engano Island, West Sumatra.

Paradoxurus hermaphroditus philippinensis Jourd.

Paradoxurus philippinensis Jourdan, C. R. Acad. Sci. (Paris), V, 1837, p. 523: Philippine Islands.

Paradoxurus sabanus Thos., Ann. Mag. Nat. Hist. (8), iii, 1909, p. 376: Spitang, North Borneo.

Paradoxurus philippinensis baritensis Loennb., Nyt. Mag. Naturwid. LXII, 1925, p. 60: Barito River, Central Borneo.

Distr.—Borneo.

Paradoxurus hermaphroditus javanicus (Horsf.).

Viverra musanga var. *javanica* Horsfield, Zool. Researches Java, 1824, pl.: Java.

Paradoxurus dubius Gray, Proc. Zool. Soc. 1832, p. 66: Java.

? *Paradoxurus macrodus* Gray, Proc. Zool. Soc. 1864, p. 538: ? Java.

Distr.—Java.

*** Paradoxurus hermaphroditus balicus Sody.**

Paradoxurus hermaphroditus balicus Sody, Ann. Mag. Nat. Hist. (10), XII, 1933, p. 439: Boelelang, North Bali.

Distr.—Bali.

Paradoxurus hermaphroditus kangeanus Thos.

Paradoxurus kangeanus Thomas, Ann. Mag. Nat. Hist. (8), 5, 1910, p. 385: Kangean Island.

Distr.—Kangean Island, Java Sea.

Genus PAGUMA Gray, 1831.[1]

Paguma larvata. Masked Palm Civet.

[*Paguma larvata larvata* Ham. Smith, in Griffith, Anim. Kingd. II, 1827, p. 281: probably South China.

Distr.—Extralimital.]

Paguma larvata robusta (Mill.).

Paradoxurus robusta Miller, Proc. Biol. Soc. Wash. XIX, 1906, p. 26: Trang, Peninsular Siam.

Distr.—Peninsular Siam.

Paguma larvata jourdanii (Gray).

Paradoxurus jourdanii J. E. Gray, Mag. Nat. Hist., n.s. I, 1837, p. 579: unknown, *subst.* Malacca.

Viverra (*Paradoxurus*) *aurata* Blainv., Osteogr. Viverra, 1842, p. 96: unknown, *subst.* Malacca.

Paguma larvata annectens Robinson and Kloss, Journ. Fed. Malay States Mus. VII, 1917, p. 243: Bukit Gantang, Perak.

Distr.—Malay States.

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[1] *Paguma.* Reviews: Pocock, Journ. Bomb. Nat. Hist. Soc. XXXVII, 1934, p. 326; Proc. Zool. Soc. 1934, p. 665. *P. l. janetta* (Victoria Point, Tenasserim) may turn up in the extreme north of Peninsular Siam, but I have no specimens from near the Isthmus of Kra. Burkill (Econ. Prod. Mal. Pen. II, 1935, p. 1661) quite wrongly refers to "*Paradoxurus leucomystax*" as the commonest of the Malayan palm-civets. The common house-civet of the Peninsula is *Paradoxurus hermaphroditus.*

Paguma larvata leucomystax (Gray).

Paradoxurus leucomystax J. E. Gray, Proc. Zool. Soc. IV, 1837, p. 88: Sumatra.

? *Paradoxurus rubidus* Blyth, Journ. Asiat. Soc. Bengal, XXVII, 1858, p. 275: loc. unknown.

Distr.—Sumatra.

Paguma larvata ogilbyi (Fraser).

Paradoxurus ogilbyi Fraser, Zool. typica, ? 1846-8, pl. 10: unknown, *subst.* Borneo.

Paguma leucocephala Gray, Proc. Zool. Soc. 1864, p. 540: Borneo.

Distr.—Borneo.

Genus ARCTICTIS Temminck, 1824.[1]

Arctictis binturong. Binturong; Bear Cat.

Arctictis binturong binturong (Raffles).

Viverra ? binturong Raffles, Trans. Linn. Soc. XIII, 1821, p. 253; Malacca.

Ictides ater F. Cuv. and Geoff., Hist. Nat. Mamm. II, 1824, pl. and text: Malacca.

Distr.—Malay Peninsula; Sumatra; Bintang and Kundur Islands, Rhio Archipelago.

*** Arctictis binturong kerkhoveni Sody.**

Arctictis binturong kerkhoveni Sody, Natuur. Tijds. Ned. Ind. XCVI, 1936, p. 43: Banka.

Distr.—Banka Island.

*** Arctictis binturong niasensis Lyon.**

Arctictis niasensis Lyon, Proc. U. S. Nat. Mus. LII, 1916, p. 443: Nias Island.

Distr.—Nias Island, West Sumatra.

Arctictis binturong penicillatus Temm.

Arctictis penicillatus Temminck, Mon. Mamm. II, 1841, p. 310: Java.

Arctictis pageli Schwarz, Ann. Mag. Nat. Hist. (8), VII, 1911, p. 636: Sandakan, North Borneo.

Distr.—Borneo; Java.

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[1] *Arctictis.* Review: Pocock, Proc. Zool. Soc. 1933, p. 1015; *see* also Kloss, Treubia, X, 1929, p. 497. I have followed Pocock and adopted the name *penicillatus* for the Javan race, but the argument is very involved and offers a fine point in nomenclatorial practice. The view could be taken that Temminck stated that his *penicillata* was the same as Raffles' *binturong*. The reference to *penicillata* has been quoted in various ways, and I have therefore given the only citation I can trace in my copy of the Mon. Mamm.

Genus ARCTOGALIDIA Merriam, 1897.[1]

Arctogalidia trivirgata. Small-toothed Palm Civet.

* **Arctogalidia trivirgata trivirgata (Gray).**
Paradoxurus trivirgata Gray, Proc. Zool. Soc. 1832, p. 68: Buitenzorg, West Java.
Distr.—Java.

Arctogalidia trivirgata stigmatica (Temm.).
Paradoxurus stigmaticus Temminck, Esquisses Zool. Côte de Guiné, Mamm. 1853, p. 121: Dusun River, South Borneo.
Arctogalidia bicolor Miller, Smiths. Misc. Coll. LXI, 1913, p. 7: Klumpang Bay, South-East Borneo.
Distr.—Borneo.

* **Arctogalidia trivirgata minor Lyon.**
Arctogalidia minor Lyon, Proc. U.S. Nat. Mus. XXXI, 1906, p. 599: Billiton Island.
Distr.—Billiton Island.

Arctogalidia trivirgata inornata Lyon.
Arctogalidia inornata Miller, Proc. Wash. Acad. Sc. III, 1901, p. 131: Bunguran Island.
Distr.—Bunguran Island, North Natuna Islands.

* **Arctogalidia trivirgata depressa Mill.**
Arctogalidia depressa Miller, Smiths. Misc. Coll. LXI, No. 21, 1913, p. 8: Bintang Island.
Distr.—Bintang Island, Rhio Archipelago.

Arctogalidia trivirgata mima Mill.
Arctogalidia mima Miller, Smiths. Misc. Coll. LXI, No. 21, 1913, p. 7: Batam Island.
Distr.—Batam Island, Rhio Archipelago.

Arctogalidia trivirgata fusca Mill.
Arctogalidia fusca Miller, Proc. U.S. Nat. Mus. XXXI, 1906, p. 269: Kundur Island.
Distr.—Kundur and Sugi Islands, Rhio Archipelago; ? Bulan Island (*subsp. incert.*).

* **Arctogalidia trivirgata simplex Mill.**
Arctogalidia simplex Miller, Proc. Acad. Nat. Sci. Philad. 1902, p. 156: Lingga Island.
Distr.—Islands of Lingga and Singkep, Lingga Archipelago.

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[1] *Arctogalidia.* Review: Pocock, Proc. Zool. Soc. 1933, p. 977, wherein it is suggested that the type locality of *trivirgata* is Malacca, but Gray said it came from "the Moluccas" which in his day fairly included Java. Further, there were no specimens from Malacca in the Leyden Museum at that date. Jentink fixed the type locality as Buitenzorg (1887). *A. t. leucotis* may well occur in the north of Peninsular Siam, but I have no proof of this. The largest skull I have seen from the Malay States has a total length of 111·5 mm. and *major* may therefore represent a slightly larger northern race.

* **Arctogalidia trivirgata bancana Schwarz.**
Arctogalidia bancana Schwarz, Ann. Mag. Nat. Hist. (8), XI, 1913, p. 297: Banka Island.
Distr.—Banka Island.

* **Arctogalidia trivirgata tingia Lyon.**
Arctogalidia tingia Lyon, Proc. U.S. Nat. Mus. XXXIV, 1908, p. 652: Tebing Tinggi Island, East Sumatra.

Arctogalidia trivirgata sumatrana Lyon.
Arctogalidia sumatrana Lyon, Proc. U.S. Nat. Mus. XXXIV, 1908, p. 653: Makapan, East Sumatra.
Distr.—Malay States; Sumatra; Pinie Island, Batu Islands, West Sumatra.

Arctogalidia trivirgata major Mill.
Arctogalidia major Miller, Proc. Biol. Soc. Wash. XIX, 1906, p. 25: Trang, Peninsular Siam.
Distr.—Peninsular Siam.

Arctogalidia trivirgata macra Mill.
Arctogalidia macra Miller, Smiths. Misc. Coll. LXI, 1913, p. 6: Domel Island, Mergui Archipelago.
Distr.—Islands of Langkawi and Terutau, Straits of Malacca.

Genus **HEMIGALUS** Jourdan, 1837.[1]

Hemigalus derbyanus. Banded Palm Civet.

Hemigalus derbyanus derbyanus (Gray).
Paradoxurus derbyanus J. E. Gray, Mag. Nat. Hist. n.s. I, 1837, p. 579: Malay Peninsula.
Viverra hardwickii Gray, Spec. Zool. 1830, p. 9: Malay Peninsula (not *V. hardwichii* (sic) Less. 1827).
Viverra derbyi Temm., Mon. Mamm. II, 1841, p. 343: Malay Peninsula.
Hemigalus derbyanus invisus Pocock, Proc. Zool. Soc. 1933, p. 1006: *nom. nov.* for *V. hardwickii* Gray.
Distr.—Malay States.

Hemigalus derbyanus boiei (Müll.).
Viverra boiei S. Müller, Tijdschr. nat. geschied. physiol. V, 1838, p. 144: South-East Borneo.
Distr.—Sumatra; Borneo.

Hemigalus derbyanus minor (Mill.).
Hemigale minor Miller, Smiths. Misc. Coll. LV, 1903, p. 43: South Pagi Island.
Distr.—South Pagi Island, West Sumatra.

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[1] *Hemigalus.* Review: Pocock, Proc. Zool. Soc. 1933, p. 999 wherein the author is quite wrong in assuming that Kloss and I had no series for comparison when we described *sipora* which form cannot be confused with either *derbyanus* or *boiei:* these two last mentioned races I hold to be distinct.

Hemigalus derbyanus sipora (Chas. and Kl.).
Hemigalea sipora Chasen and Kloss, Proc. Zool. Soc. 1927, p. 817: Sipora Island.
Distr.—Sipora Island, West Sumatra.

Hemigalus hosei (Thos.).[1]
Hemigale hosei Thomas, Ann. Mag. Nat. Hist. (6), IX, 1892, p. 250: Mt. Dulit, Sarawak, 4,000 ft.
Distr.—Borneo.

Genus CYNOGALE Gray, 1836.[2]

Cynogale bennettii Gray. Otter Civet.
Cynogale bennettii Gray, Proc. Zool. Soc. IV, 1837, p. 88: Sumatra.
Lamictis carcharias Blainv. in Jourdan, C.R. Acad. Sci. (Paris), V, 1837, p. 596: said to be from Java, but the species does not occur there. Reference not seen.
Potamophilus barbatus S. Müll., Tijdschr. nat. geschied. physiol. V, 1838, p. 142: Borneo.
Distr.—Malay States; Sumatra; Borneo.

Genus HERPESTES Illiger, 1811.[3]

Herpestes brachyurus.[4] Short-tailed Mongoose.

Herpestes brachyurus brachyurus Gray.
Herpestes brachyurus Gray, Proc. Zool. Soc. IV, 1837, p. 88: Malacca.
Distr.—Malay States.

Herpestes brachyurus sumatrius Thos.
Herpestes brachyurus sumatrius Thomas, Ann. Mag. Nat. Hist. (9), VIII, 1921, p. 134: Deli, North-East Sumatra.
Distr.—Sumatra.

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[1] *Hemigalus hosei.* Thomas (1912) founded the genus *Diplogale* for this species.

[2] *Cynogale.* Review: Pocock, Proc. Zool. Soc. 1933, p. 1032 (wherein the record of a specimen from Singapore Island must be discounted as there is no evidence that this species occurs in a wild state on the island). Furthermore, there is no reliable record from Java. I have seen adults from all three land masses, but less than a dozen in all: no subspecies are evident on this limited material.

[3] *Herpestes.* Revisions in part.—Kloss, Journ. F.M.S. Mus. VII, 1917 pp. 123 and 241; Thos., Ann. Mag. Nat. Hist. (9), VIII, 1921, p. 134; Pocock, Journ. Bomb. Nat. Hist. Soc. XXXIX, 1937, p. 211 (Indian forms).

[4] *H. brachyurus.* There is no reliable evidence for the occurrence of this species in Java and *H. b. javanensis* Bechthold, Zeits. f. Saeug. XI, 1936, p. 150 is founded on an ex-managerie specimen in the British Museum of doubtful provenance but labelled "Java". Mr. R. I. Pocock regards the type as belonging to the Malayan race. On colour I should not care to separate a Sumatran race but I have seen very few skins and no good skulls. Skins from Borneo in the British Museum and elsewhere divide into two colour groups as Thomas noticed but I cannot yet appreciate that the difference is also geographical, *i.e.*, subspecific.

Herpestes brachyurus rajah Thos.

Herpestes brachyurus rajah Thomas, Ann. Mag. Nat. Hist. (9), VIII, 1921, p. 135: Sarawak.

Herpestes brachyurus dyacorum Thos., Ann. Mag. Nat. Hist. (9), VIII, 1921, p. 135: Mt. Dulit, Sarawak.

Distr.—Borneo.

* **Herpestes hosei Jent.** Hose Mongoose.

Herpestes Hosei Jentink, Notes Leyd. Mus. XXIII, 1903, p. 226: Baram River, Sarawak.

Distr.—Borneo.

Herpestes semitorquatus.[1] Collared Mongoose.

Herpestes semitorquatus semitorquatus Gray.

Herpestes semitorquatus J. E. Gray, Ann. Mag. Nat. Hist. XVIII, 1846, p. 211: Borneo.

Distr.—Borneo.

Herpestes semitorquatus uniformis (Rob. and Kl.).

Mungos semitorquatus uniformis Robinson and Kloss, Journ. Fed. Malay States Mus., VII, 1919, p. 302: Mt. Pasaman, Ophir district, West Sumatra.

Distr.—Sumatra.

Herpestes edwardsii.[2] Common Indian Mongoose.

Herpestes edwardsii edwardsii Geoff.

Herpestes edwardsii Geoffroy, Descr. de l'Egypte, ii, 1812, p. 139: Madras (Pocock, 1937).

Herpestes frederici Desmar., Dict. Sci. Nat. XXIX, 1823, p. 60: Malacca.

Herpestes malaccensis Fisch., Syn. Mamm. 1829, p. 164: Malacca.

Distr.—Malay States (introduced).

Herpestes urva (Hodgs.). Crab-eating Mongoose.

Gulo urva Hodgson, Journ. Asiat. Soc. Bengal, V, 1836, p. 238; Nepal.

Distr.—Peninsular Siam.

Herpestes javanicus.[3] Javan Mongoose.

Herpestes javanicus javanicus (Geoff.).

Ichneumon javanicus Geoffroy, Descr. de l'Egypte, ii, 1812, p. 138: West Java.

? *Herpestes ruber* Geoff., Descr. de l'Egypte, 1812 ,p. 138.

Distr.—Java (part).

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[1] *Herpestes semitorquatus.* According to an old note of mine there is an old skin of an immature example of this form from Sumatra in the British Museum labelled as the type of "*H. rafflesi*" but I cannot make out that the name was ever published.

[2] *Herpestes edwardsii.* I have followed Pocock throughout this species.

[3] Two species of this group distinguished chiefly by size occur in the Malay Peninsula: only one can be the local representative of *javanicus* and it appears to be the larger form. *H. auropunctatus* is the earliest name for the other association.

* **Herpestes javanicus orientalis Sody.**
Herpestes javanica orientalis Sody, Natuur. Tijschr. Ned. Ind. XCVI, 1936, p. 44: Besoeki, East Java.
Distr.—Java (part).

Herpestes javanicus peninsulæ (Schwarz).
Mungos exilis peninsulae Schwarz, Ann. Mag. Nat. Hist. (8), VI, 1910, p. 231: Bangkok.
Herpestes incertus Kloss, Journ. F.M.S. Mus., VII, 1917, p. 125: Trang, Peninsular Siam.
Distr.—Malay Peninsula.

Herpestes auropunctatus. Small Indian Mongoose.

[**Herpestes auropunctatus auropunctatus (Hodgs.).**
Mangusta auropunctata Hodgson, Journ. Asiat. Soc. Beng. V, 1836, p. 235: Nepal.
Distr.—Extralimital.]

Herpestes auropunctatus perakensis (Kloss).
Mungos perakensis Kloss, Journ. Fed. Malay States Mus. VII, 1917, p. 124: Taiping, Perak.
Distr.—Malay States.

Family FELIDÆ.[1]

Genus FELIS Linn. 1758.

Felis tigris.[2] Tiger.

Felis tigris tigris Linn.
Felis tigris Linn., Syst. Nat. ed. 10, 1758, p. 41: Bengal.
Distr.—Malay Peninsula.

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[1] *Felidae.* For the genus splitter the following names are available *Panthera* Oken, 1816 (*pardus*); *Tigris* Oken, 1816 (*tigris*): *Neofelis* Gray, 1867 (*nebulosa*); *Pardofelis* Severtzow, 1858 (*marmorata*); *Profelis* Severtzow, 1858 (*temminckii*); *Prionailurus* Severtzow, 1858 (*bengalensis*); *Zibethailurus* Severtzow, 1858 (*viverrina*); *Badiofelis* Pocock, 1932 (*badia*): *Ictailurus* Severtzow, 1858 (*planiceps*). An important reference is Pocock, Ann. Mag. Nat. Hist. (8), XX, 1917, p. 329, "The Classification of the existing *Felidae.*"

I do not know of any really established feral race of *Felis catus* in Malaysia. *F. deliensis* Hilzheimer, Zool. Anz. XXX, 1906, p. 112 (Sumatra) is a local synonym of *catus.*

[2] *Felis tigris.* Revision: Pocock, Journ. Bomb. Nat. Hist. Soc. XXXIII, 1930, p. 505; *see* also Sody *op. cit.* XXXVI, 1933, p. 234; and Brongersma, Zool. Med. (Leiden), XVIII, 1935, p. 64, wherein it is suggested that perhaps the valid name for the Sumatran tiger is *Felis tigris ruber* Ludeking, Genesk. Tijdschr. Ned. Ind. IX. 1862, p. 41: Agam, West Sumatra. I agree with Brongersma that the name is of uncertain application: it probably refers to *Felis temminckii.*

Tigers have been reported from the islands of Bintang, Panjait Layer and Setoko in the Rhio Archipelago, but no specimen seems to have been obtained.

Felis tigris sumatræ (Pocock).

Panthera tigris sumatrae Pocock, Journ, Bomb. Nat. Hist. Soc. XXXIII, 1929, p. 535: Deli, North-East Sumatra.

Felis tigris sumatrana Blainv., Ostéograph. II, Atlas pl. VII; text 1839–1864: (*ref. not seen*), *not F. sumatrana*, Horsf. 1821.

Distr.—Sumatra.

Felis tigris sondaica Temm.

Felis tigris sondaicus Temminck, Fauna Japonica, Mamm. 1845, p. 43: Java.

Distr.—Java.

Felis tigris balica Schwarz.

Felis tigris balica Schwarz, Ann. Mag. Nat. Hist. (8), X, 1912, p. 325: Bali.

Distr.—Bali.

Felis pardus.[1] Leopard; Panther.

[**Felis pardus pardus Linn.**

Felis pardus Linn., Syst. Nat. ed. 10, 1758, p. 41: Egyptian Sudan.

Distr.—Extralimital.]

Felis pardus fusca Meyer.

Felis fusca Meyer, Zoolog. Annalen, I, 1794, p. 394: Bengal (*ref. not seen*).

Distr.—Malay Peninsula.

Felis pardus melas G. Cuv.

Felis melas G. Cuvier, Ann. Mus. 14, 1809, p. 152: Java.

Felis variegata Wagn., in Schreber's Saeug., Suppl. 2, 1841, p. 483: Java.

Felis variegata var. *B. nigricans, atro-maculata*, id., loc. cit.: Java.

Panthera variegata var. *nigra* Fitz., SB. Kais. Akad. Wien, LVIII, pt. I, 1868, p. 473: Java.

Distr.—Java; Kangean Islands (Kangean and Paliat).

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[1] *Felis pardus.* Review: Pocock, Journ. Bomb. Nat. Hist. Soc. XXXIV, 1930, p. 307. *See* also Brongersma, Zool. Med. (Leiden), XVIII, 1935, p. 47. Sherborn gives the original reference to *melas* as Péron in A. G. Desmarest, Ency. Méth. (Mamm.). (1), 1820, p. 223. None of the references to literature given under *melas* is in the Singapore Library and the citations are taken from Pocock.

Sumatra is omitted from the range of the leopard, but I am not altogether convinced that it does not occur there either in very small numbers on the south-east coast, or accidentally. Kloss always believed that a beast he fired at in Siak was a leopard. The Kangean Islands are included in the range purely on Shortridge's evidence quoted by Pocock. I do not think the Malayan leopard can be referred to either *delacouri*, or *melas* as Pocock has suggested. Even from the south of the Peninsula, the skulls of old males will exceed 9 in. in total length and I have never seen a Malayan skin of the spotted variety like the figure of the type of *delacouri*. I should also refer spotted leopards from Raheng in West Siam and Sriracha in South-East Siam to *fusca*, not *delacouri*.

Felis nebulosa.[1] Clouded Leopard.

[**Felis nebulosa nebulosa** Griff.

Felis nebulosa E. Griffith, Descr. Anim. (Carn.), 1821, p. 37: Canton.

Distr.—Extralimital.]

Felis nebulosa diardi Cuv.

Felis diardi G. Cuvier, Oss. Fossiles 1823, IV, p. 437: Java, error = Sumatra.

Felis Macrocelis Temm., in Horsf., Zool. Journ. I, 1825, p. 543: Bencoolen, West Sumatra.

Distr.—Malay Peninsula; Sumatra; Borneo.

Felis temminckii.[2] Golden Cat.

Felis temminckii temminckii Vig. and Horsf.

Felis temminckii Vigors and Horsfield, Zool. Journ. III, 1827, p. 451: Sumatra.

Distr.—Malay Peninsula; Sumatra.

Felis badia Gray.[3] Bornean Bay Cat.

Felis badia Gray, Proc. Zool. Soc. 1874, p. 322: Sarawak.

Distr.—Borneo.

Felis planiceps Vig. and Horsf.[4] Flat-headed Cat.

Felis planiceps Vigors and Horsfield, Zool. Journ. III, 1828, p. 450: Sumatra.

Distr.—Malay Peninsula; Sumatra; Borneo.

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[1] *Felis nebulosa.* Review: Brongersma, Zool. Med. (Leiden) XVIII, 1935, p. 7. Jentink, Cat. Syst. Mamm. 1892, p. 98 records this species from the Batu Islands, but subsequent collectors do not mention the species and confirmation is required. Although I use the oldest local name for all Malaysian specimens it is almost certain that the Malayan and Bornean forms should be separated racially. Without going into details of pattern it can be said that the Bornean animal is greyer and more heavily marked. But it is not smaller, for adult males from Sarawak have the skulls running up to 182 mm. in total length. I cannot say which of these two races agrees with topotypes of *diardi*.

[2] *Felis temminckii.* Revision: Pocock, Proc. Zool. Soc. 1932, p. 755. *See* also Brongersma, Zool. Med. (Leiden), XVIII, 1935, p. 10. Although included by Hose in his "Mammals of Borneo" (1893) I do not know of any specimen with reliable data from Borneo. Hose's book needs to be used with caution. Some of the descriptions were cut out of books dealing with other areas and do not apply to Bornean forms. The largest male I have seen from the Malay States has the total length of the skull, 147 mm. The few specimens examined from Sumatra, the Malay States and Siam seem much alike in colour and all are in the golden-red pelage, but according to Dammerman (1930) the black variety occurs in Sumatra.

[3] *Felis badia.* Review: Pocock, Proc. Zool. Soc. 1932, p. 749. *See* also Brongersma, Zool. Med. (Leiden) XVIII, 1935, p. 34.

[4] *Felis planiceps.* *See* Brongersma, Zool. Med. (Leiden), XVIII, 1935, p. 35.

Felis marmorata.[1]

Marbled Cat.

Felis marmorata marmorata Mart.

Felis marmorata Martin, Proc. Zool. Soc. 1836, p. 107: Sumatra.

Distr.—Malay States; Sumatra; Borneo.

Felis viverrina Benn.[2]

Fishing Cat.

Felis viverrinus Bennett, Proc. Zool. Soc. 1833, p. 68: India.

Prionailurus viverrinus rhizophoreus Sody, Natuur. Tijds. Ned. Ind. XCVI, 1936, p. 45: Pamanoekan, north coast of West Java.

Distr.—Java; Sumatra.

Felis bengalensis.[3]

Leopard Cat.

[**Felis bengalensis bengalensis Kerr.**

Felis bengalensis Kerr, Anim. Kingd. 1792, p. 51: Bengal.

Distr.—Extralimital.]

Felis bengalensis tingia Lyon,

Felis tingia Lyon, Proc. U. S. Nat. Mus. XXXIV, 1908, p. 658: Tebing Tinggi Island, east coast Sumatra.

Distr.—Malay Peninsula; Sumatra (part).

Felis bengalensis sumatrana Horsf.

Felis sumatrana Horsfield, Zool. Researches Java, 1821, pl. and text: Sumatra, *restr.* Bencoolen, West Sumatra.

Felis punctulata Elliot (ex. Temm. MS.), Mon. Felidæ, 1882, pt. 10, p. 2 of text to *F. javensis:* Palembang, Sumatra.

Distr.—Sumatra (part); Nias Island.

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[1] *Felis marmorata.* Revision: Pocock, Proc. Zool. Soc. 1932, p. 741. See also Brongersma, Zool. Med. (Leiden), XVIII, p. 31.

[2] *Felis viverrina.* Review: Pocock, Faun. Brit. Ind., Mamm. I, 1939, p. 281. *See* also Brongersma, Zool. Med. (Leiden), XVIII, 1935, p. 12.

[3] *Felis bengalensis. See* Brongersma, Zool. Med. (Leiden), XVIII, 1935, p. 13. Although so very variable in colour and pattern in Malaysia, this species can be separated into subspecies based on broad average characters. A series from the Malay States is about the same in general tone as a group of specimens from Siam proper, but Malayan skulls run smaller than do those from India and Siam, and furthermore, pantherine spots on the back (between the flanks and the pattern of the centre line) are the exception, and solid spots the rule, which is the reverse of the case presented by my Siamese material. The names *wagati* (Moulmein) and *tenasserimensis* seem to apply to the "*bengalensis*" section and not to a race like that inhabiting the Malay States and I have, therefore, used for the latter Lyon's name based on a skin from a flat coastal island of Sumatra, only just out of sight of Singapore Island, but I have not seen the type of *tingia. Sumatrana* has fewer and smaller markings than skins from the Peninsula; and, on an average, *borneoensis* is brighter and more rufous in colour than either race. The Javan form is very dull, although specimens approximating to it sometimes turn up in the Malay Peninsula.

Felis bengalensis javanensis Desm.

Felis javanensis Desmarest, N. Dict. H. N. ed. 2, VI, 1816, p. 115: Java.

? *Felis undata* Desm., N. Dict. H. N. ed. 2, VI, 1816, p. 115: Java.
Felis minuta Temm., Mon. Mamm. I, 1824, p. 130: Java.

Distr.—Java; Bali.

Felis bengalensis borneoensis (Bronga.).

Prionailurus bengalensis borneoensis Brongersma, Zoologische Mededeelingen (Leiden), XVIII, 1935, p. 26: Rantau, South-East Borneo.

Distr.—Borneo.

Order CETACEA[1]

Family BALÆNIDÆ.

Genus BALÆNOPTERA Lacépède, 1803.

Balænoptera borealis Less. Rudolphi Rorqual.

Balaenoptera borealis Lesson, Hist. Nat. des Cétacées, 1828, p. 342: North Sea.

Sibbaldius schlegelii Flower, Proc. Zool. Soc. 1864, p. 408: Java.

Distr.—Borneo; Java; Gulf of Siam (ashore at Kandhuli).

Balænoptera musculus (Linn.). Blue Whale.

Balaena Musculus Linn., Syst. Nat. 10th ed. 1758, p. 76: North Sea.

Balaenoptera indica Blyth, Journ. Asiat. Soc. Beng. XXVIII, 1859, p. 488: stranded on Amherst Island, Arakan.

Distr.—Straits of Malacca; Java.

Balænoptera physalus (Linn.). Common Finback Whale; Rorqual.

Balaena physalus Linn., Syst. Nat. ed. 10, 1758, p. 75: European Seas.

Distr.—South coast Java.

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[1] *Cetacea.* In this group of which I know little and have very few specimens I have been content to accept the conclusions of other authors. *See* Max Weber, "Die Cetaceen der Siboga—Exped.," 1923; and Dammerman, "On Globicephala and some other Delphinidæ from the Indo-Australian Archipelago," Treubia, V, 1924, p. 340. There are a number of references to *Sotalia sinensis* in Malaysian literature, but I know of no locally obtained specimen.

Family PHYSETERIDÆ.

Genus PHYSETER Linn., 1758.

Physeter catodon Linn. Sperm Whale; Cachalot.

Physeter Catodon Linn., Syst. Nat. 10th ed. 1758, p. 76: Arctic Ocean.

Distr.—South China Sea; Java Sea; Straits of Malacca; Indian Ocean coasts of Sumatra and Java.

Genus ZIPHIUS Cuvier, 1823.

Ziphius cavirostris Cuv. Goose-beaked Whale.

Ziphius cavirostris Cuvier, Oss. foss. 2nd ed. 5, 1823, p. 353: Mediterranean.

Distr.—Java.

Family DELPHINIDÆ.

Genus ORCINUS Fitzinger, 1860.

Orcinus orca (Linn.). Grampus; Killer.

Delphinus orca Linn., Syst. Nat. 10th ed. 1758, p. 77: Atlantic Ocean.

Distr.—Coast of Sarawak.

Genus ORCAELLA Gray, 1866.

Orcaella brevirostris (Owen). Large Indian Porpoise.

Phocaena (Orca) brevirostris Owen, Trans. Zool. Soc. VI, 1866, p. 24, pl. IX: Bay of Bengal.

Distr.—Straits of Malacca; east coast of Malay Peninsula; coasts of Borneo and Java.

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Genus MEOMERIS Gray, 1847.

Meomeris phocænoides (Cuv.). Little Indian Porpoise.

Delphinus phocaenoides Cuvier, Règne Anim. ed. 2, i, 1829, p. 291: Cape of Good Hope.

Distr.—Straits of Malacca; near Singapore Island; coast of Sarawak; Java Sea off Java and Sumatra.

Genus GLOBICEPHALA Lesson, 1828.

Globicephala macrorhyncha Gray. Indian Pilot Whale; Blackfish.

Globicephalus macrorhynchus J. E. Gray, Zool., Erebus and Terror, Mamm., 1846, p. 33: Unknown locality.

Globicephalus indicus Blyth, Journ. Asiat. Soc. Bengal, XXI, 1852, p. 358; XXVIII, 1859, p. 490: stranded near Calcutta.

Distr.—Straits of Malacca; Pulau Weh, North Sumatra; coast of Java.

Genus DELPHINUS Linn. 1758.

Delphinus delphis Linn. Common Dolphin.

Delphinus delphis Linn., Syst. Nat. ed. 12, i, 1766, p. 108: Atlantic Ocean.

Distr.—Straits of Malacca.

Genus PRODELPHINUS Gervais, 1880.

Prodelphinus malayanus (Less.). Malay Dolphin.

Delphinus malayanus Lesson, Voy. Couquille, Zool. I, 1826, p. 184; atlas, pl. IX, p. 5: between Java and Borneo.

Distr.—Singapore; Banka Strait; coast of Java.

Genus STENO Gray, 1846.

Steno rostratus (Desm.). Rough-toothed Dolphin.

Delphinus rostratus Desmarest, Nouv. Dict. Sci. Nat. IX, 1817, p. 160: Indian Ocean.

Distr.—Coast of Java.

Genus SOTALIA Gray, 1866.

Sotalia plumbea (Cuv.). Plumbeous Dolphin.

Delphinus plumbeus Cuvier, Règne Anim., 2nd ed., I, 1829, p. 283: Indian Ocean.

Distr.—Straits of Malacca.

Sotalia borneensis Lyd. Malaysian Dolphin.

Sotalia borneensis Lydekker, Proc. Zool. Soc. 1901, p. 88: mouth of the Sarawak river.

Distr.—Straits of Malacca; coast of Sarawak.

Genus TURSIOPS Gervais, 1855.

Tursiops catalania (Gray). Bottle-nose Porpoise.

Delphinus catalania Gray, Proc. Zool. Soc. 1862, p. 143: Australia.

Distr.—Coasts of Sumatra and Java.

Order EDENTATA

Family MANIDÆ.

Genus MANIS Linn. 1758.

Manis javanica Desm.[1] Scaly Anteater; Pangolin.

Manis javanica A. G. Desmarest, Ency. Méth. (Mamm.), II, 1822, p. 377: Java.

Manis aspera Sundv., K. Vet. Ac. Handl. 1842 (1843), p. 253: Sumatra.

Manis sumatrensis Ludek., Geneesk. Tijdschr. Ned Ind. (9), N.S. 4, 1862, p. 40: Sumatra.

Pholidotus malaccensis Fitz., Sitzb. K. Akad. Wiss. Wien, 1872, p. 50: Malacca.

Pholidotus labuanus Fitz., *tom. cit.* p. 56: Borneo.

Distr.—Malay Peninsula (including Junk Seylon, Penang and Singapore); Sumatra; islands of the Rhio and Lingga Archipelagos (Bintang, Batam, Bulan, Galang, Kundur, Lingga, Singkep and Sanglar); Banka; Billiton; West Sumatran islands of Nias and Pagi; Borneo; Bunguran Island, North Natuna Islands; Karimata Island; Java; Bali.

Order RODENTIA

Family LEPORIDÆ.

Genus NESOLAGUS Major, 1899.

Nesolagus netscheri (Schleg.). Sumatra Hare.

Lepus netscheri Schlegel, Notes Leyden Mus. II, 1880, p. 62: Padang Highlands, Sumatra.

Distr.—Sumatra.

Genus LEPUS Linn. 1758.

Lepus nigricollis F. Cuv.[2] Black-naped Hare.

Lepus nigricollis F. Cuvier, Dict. Sci. Nat. XXVI, 1823, p. 307: Madras.

Lepus melanauchen Temm., Faune Jap., Introd. 1835, p. 13: Java.

Distr.—Java (West).

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[1] *Manis.* Revision: Jentink, Notes Leyd. Mus. IV, 1882, p. 193. Pocock proposed the genus *Paramanis* for *javanica* in 1924. *M. leptura* Blyth, Journ. As. Soc. Beng. 1842, p. 454 from an unknown locality; and *Manis guy* Focillon, Rev. Mag. Zool. 1850, p. 513, also of uncertain provenance, may be Malaysian synonyms of *javanica*.

[2] *Lepus nigricollis.* Generally believed to have been introduced into Java from Ceylon. I have not been able to compare material from the two places.

Family SCIURIDÆ.[1]

Genus PETAURISTA Pallas, 1792.[2]

Petaurista petaurista.[3] Large Red Flying Squirrel.

Petaurista petaurista petaurista (Pall.).

Sciurus petaurista Pallas, Zool. Misc. 1766, p. 54: Preanger Regencies, West Java (restr. *Rob. and Kl.* 1918).

Pteromys nitidus Desm., Nouv. Dict. Hist. Nat. XXVII, 1818, p. 403: Java.

Distr.—Java (West and Central).

Petaurista petaurista nigricaudatus Rob. and Kl.

Petaurista petaurista nigricaudatus Robinson and Kloss, Journ. F.M.S. Mus. VII, 1918, p. 223: Idjen Massif, East Java, 5.700 ft.

Distr.—Java (Idjen mountains).

Petaurista petaurista rajah Thos.

Petaurista nitida rajah Thomas, Ann. Mag. Nat. Hist. (8) I, 1908, p. 251: Mt. Dulit, Baram district, Sarawak.

Distr.—Borneo (pt.).

* **Petaurista petaurista lumholtzi Gyld.**[4]

Petaurista petaurista lumholtzi Gyldenstolpe, Kungl. S.V. Vet. Akad. Handl. 60, 6, 1919, p. 28: Poeroek Tjahoe, Barito River, Central Borneo.

Distr.—Borneo (pt.).

Petaurista petaurista nitidulus Thos.

Petaurista nitidula Thomas, Nov. Zool. VII, 1900, p. 592: Bunguran Island.

Distr.—Bunguran Island, North Natuna Islands.

Petaurista petaurista cicur Rob. and Kl.

Petaurista nitida cicur Robinson and Kloss, Ann. Mag. Nat. Hist. (8), XIII, 1914, p. 223: Bankok Klap, Bandon, N.E. Malay Peninsula.

Distr.—Peninsular Siam (south to Tung Song).

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[1] *Sciuridae.* Revision: Rob. and Kl., Rec. Ind. Mus. XV, 1918, p. 171; Jentink, Notes Leyd. Mus. V, 1883, p. 91.

[2] *Petaurista.* Revision, Wrought., Journ. Bomb. Nat. Hist. Soc. XX, 1911, p. 1012. *P. taylor* Thos. (Journ. Bomb. Nat. Hist. Soc. XXIII, 1914, p. 205: South Tenasserim) will probably be found in North Peninsular Siam.

[3] *Petaurista petaurista.* Revision: Thos., Ann. Mag. Nat. Hist. (8), I, 1908, p. 250.

[4] *P. p. lumholtzi.* Known only by the type which is in Stockholm and, therefore, inaccessible to me.

Petaurista petaurista melanotus (Gray).[1]

Pteromys melanotus Gray, Charlesworths Mag. Nat. Hist. I, 1837, p. 584: Nepal (error), subst. Selangor, Malay States, *Rob. and Kl.* 1918).

Distr.—Malay Peninsula (north to Patani); Tioman Island.

Petaurista petaurista terutaus Lyon.

Petaurista terutaus Lyon, Proc. Biol. Soc. Wash, XX, 1907, p. 17: Terutau Island.

Distr.—Terutau Island, Straits of Malacca.

Petaurista petaurista penangensis Rob. and Kl.

Petaurista petaurista penangensis Robinson and Kloss, Journ. F.M.S. Mus. VII, 1918, p. 224: Penang Island.

Distr.—Penang Island, Straits of Malacca.

Petaurista petaurista batuanus Mill.

Petaurista batuana Miller, Smiths. Misc. Coll. 45, 1903, p. 27: Tana Bala, Batu Islands, West Sumatra.

Petaurista nitida marchio Thos., Ann. Mag. Nat. Hist. (8), I, 1908, p. 251, Si Rambi, Sumatra.[2]

Distr.—Sumatra; Batu Islands, West Sumatra.

Petaurista petaurista stellaris Chas.[3]

Petaurista petaurista stellaris Chasen, Bull. Raffles Mus. 15, 1940, p. 113: Bintang Island.

Distr.—Bintang Island, Rhio Archipelago.

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[1] Only two specimens from Pulau Tioman are available for comparison They suggest that a series would possibly be separable from *P. p. melanotus* on rather brighter, paler colour.

[2] *See* Rob. and Kl., Journ. F.M.S. Mus. VII, 1919, p. 269.

3 Petaurista petaurista stellaris subsp. nov.

Intermediate in colour between the very bright *P. p. melanotus* of the Malay Peninsula, and the much darker, more blackened *batuanus* of Sumatra, but rather nearer to *batuanus* from which it differs in the less blackened upper parts; paler cheeks and muzzle; and paler, less rufous and more cinnamon tail and under parts.

Type.—Adult male, skin and skull, collected on Bintang Island, Rhio Archipelago, on 10th June, 1930, by a Dayak collector, Raffles Museum No. 2771.

Skull.—Greatest length, 68·6; condylo-basilar length, 60·3; zygomatic breadth, 45·9; upper molar row (alveoli), 15·9; median nasal length, 20·4; least interorbital breadth, 14·3 mm.

Remarks.—In the absence of topotypes of *batuanus* and specimens from the Sumatran mainland, I referred the two specimens on which this new race is founded to *batuanus* in Bull. Raffles Mus. 10, 1935, p. 13.

Petaurista petaurista mimicus Mill.

Petaurista mimicus Miller, Smiths. Misc. Coll. LXI, No. 21, 1913, p. 27: Rupat Island, East Sumatra.
Distr.—Rupat Island, East Sumatra.

Petaurista elegans. Spotted Flying Squirrel.

Petaurista elegans elegans (Müll.).

Pteromys elegans Müller in Temminck, Verh. nat. ges. Ned. overz. bezitt., Zool. (Zoogd. 1839), pp. 35 and 56: Island of Nusa Kumbangan, South Java.
Distr.—Java.

Petaurista elegans punctatus (Gray).

Pteromys punctatus Gray, Ann. Mag. Nat. Hist. XVIII, 1846, p. 211: Malacca.
Distr.—Malay States.

Petaurista elegans sumatranus Kl.

Petaurista punctata sumatrana Kloss, Journ. F.M.S. Mus. X, 1921, p. 230: Padang Highlands, West Sumatra.
Distr.—Sumatra.

Petaurista elegans banksi Chas.[1]

Petaurista punctatus banksi Chasen, Bull. Raffles Mus. 8, 1933, p. 194: Mt. Kinabalu, North Borneo, 5.500 ft.
Distr.—Borneo.

Genus **IOMYS** Thomas, 1908.

Iomys horsfieldii. Horsfield Flying Squirrel.

Iomys horsfieldii horsfieldii (Waterh.).

Pteromys (Sciuropterus) Horsfieldii Waterhouse, Proc. Zool. Soc. for 1837, 1838, p. 87: "either from Java or Sumatra."
Distr.—Sumatra; ? Java.

Iomys horsfieldii davisoni (Thos.).

Sciuropterus davisoni Thomas, Ann. Mag. Nat. Hist. (5), XVII, 1886, p. 84: Malacca.
Distr.—Malay States.

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[1] In the original description of *banksi* I omitted to make a direct comparison with *elegans*. The two forms are quite distinct: *elegans* has the black back heavily frosted, or sometimes merely mingled with white hairs, whereas in *banksi* the back is flecked with white in such a way that it could also be described as heavily spotted.

Iomys horsfieldii penangensis Chas.[1]

Iomys horsfieldii penangensis Chasen, Bull. Raffles Mus. 15, 1940, p. 115: Penang Island.

Distr.—Penang Island, Straits of Malacca.

***Iomys horsfieldii lepidus Lyon.**

Iomys lepidus Lyon, Proc. U.S. Nat. Mus. XL, 1911, p. 78: Batu Jurong, Kendawangan River, South-West Borneo.

Distr.—Borneo (pt.).

Iomys horsfieldii thomsoni (Thos.).

Sciuropterus Thomsoni Thomas, Ann. Mag. Nat. Hist. (7), V, 1900, p. 275: Baram district, Sarawak.

Distr.—Borneo (pt.).

Iomys horsfieldii sipora Chas. and Kl.[2]

Iomys horsfieldi sipora Chasen and Kloss, Proc. Zool. Soc. 1927, p. 819: Sipora Island.

Distr.—Sipora Island, Mentawi Islands, West Sumatra.

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[1] **Iomys horsfieldii penangensis subsp. nov.**

Diagnosis.—Like *I. h. davisoni* of the Malayan mainland, but lighter and brighter in colour on the upper parts and tail; the back much less blackened; the hands and feet, paler. Tooth row, longer.

Type.—Adult male (skin and skull), collected on Penang Island, on 28th March, 1911, by E. Seimund. Raffles Museum ex. Selangor Mus. No. 1431/11.

Measurements.—Head and body, 182; tail, 175; hind-foot, 35; ear, 26 mm. (collector's measurements from the flesh). *Skull.*—greatest length, 44·5; condylo-basilar length, 38; zygomatic width, 26·8; length of a nasal, 12·8; upper molar row (alveoli), 9·9 mm.

Remarks.—Eight specimens from Penang have been compared with seventeen from the mainland. The latter are fresher skins but I do not think that this entirely accounts for the great difference in colour between the two series. Seven adults of *penangensis* have an average length of the upper tooth row (alveoli) of 9·8 mm. (9·4–10 mm.) against an average of 9·2 mm. in ten adults of *davisoni* (8·7–9·5 mm. in sixteen specimens). Two specimens from Singapore Island have short tooth rows (8·8 mm.), but are like *penangensis* in colour. They may represent yet another race, or perhaps they are like the Sumatran *horsfieldii*, which I have never seen.

[2] *I. h. sipora* is a remarkably distinct form and only those who take the broadest view of the trinominal function will link it to *horsfieldii*. Typical *horsfieldii* has not been obtained in Java during recent years and it seems likely that the species does not really occur on the island.

Genus PTEROMYSCUS Thomas, 1908.

Pteromyscus pulverulentus. Günther Flying Squirrel.

Pteromyscus pulverulentus pulverulentus (Günth.).
Sciuropterus pulverulentus Günther, Proc. Zool. Soc. 1873, p. 413, pl. XXXVIII: Penang Island.
Distr.—Malay States; Sumatra.

Pteromyscus pulverulentus borneanus Thos.
Pteromyscus borneanus Thomas, Ann. Mag. Nat. Hist. (8), I, 1908, p. 7: Baram district, Sarawak.
Distr.—Borneo.

Genus PETAURILLUS Thomas, 1908.[1]

Petaurillus hosei Thos. Pigmy Flying Squirrels.
Sciuropterus Hosei Thomas, Ann. Mag. Nat. Hist. (7), V, 1900, p. 275: Baram River, Sarawak.
Distr.—Borneo.

Petaurillus emiliæ Thos.
Petaurillus emiliae Thomas, Ann. Mag. Nat. Hist. (8), I, 1908, p. 8: Baram district, Sarawak.
Distr.—Borneo.

Petaurillus kinlochii (Rob. and Kl.).
Sciuropterus (Petaurillus) kinlochii Robinson and Kloss, Journ. F.M.S. Mus. IV, 1911, p. 171: Kapar, Selangor, Malay States.
Distr.—Malay States.

Genus HYLOPETES Thos., 1908.[2]

Hylopetes sagitta. Small Flying Squirrel.

Hylopetes sagitta sagitta (Linn.).
Sciurus sagitta Linn., Syst. Nat. ed. 12, 1766, p. 88: Java.
Pteromys lepidus Horsf., Zool. Res. in Java (5), 1822, (descr. and pl.): Java.
Distr.—Java.

Hylopetes sagitta harrisoni (Stone).
Sciuropterus harrisoni Stone, Proc. Acad. Sci. Phil. 1900, p. 462: "Menbuang River", Sarawak.
Hylopetes harrisoni careli Gyld., Kungl. Sv. Vet. Akad. Handl. 60, 6, 1919, p. 29: North-East Dutch Borneo.
Distr.—Borneo.

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[1] *Petaurillus.* So few specimens of this genus are known that I have left all the proposed names as nominal species.

[2] *Hylopetes.* *See* Thos., Ann. Mag. Nat. Hist. (8), I, 1908, p. 1 (genera of *Sciuropterus* group).

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Hylopetes sagitta everetti (Thos.).

Sciuropterus everetti Thomas, Nov. Zool. 1895, p. 27: Bunguran Island.

Distr.—Bunguran Island, North Natuna Islands.

Hylopetes sagitta aurantiacus (Wagn.).

Pteromys aurantiacus Wagner, Arch. f. Naturg. VII, 1841, p. 135: Banka.

Distr.—Banka Island.

Hylopetes sagitta sipora Chas.[1]

Hylopetes sagitta sipora Chasen, Bull. Raff. Mus. 15, 1940, p. 117: Sipora Island.

Distr.—Sipora Island, Mentawi Islands, West Sumatra.

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[1] **Hylopetes sagitta sipora subsp. nov.**

Hylopetes aurantiacus Chas. and Kl. (nec Wagn.), Proc. Zool. Soc. 1927, p. 821.

A large subspecies, nearest to *amoenus* of Kundur Island, but the tail, excluding a small white tip, almost uniformly dull brownish black, with the base slightly paler, browner in general colour, but not markedly bicolored as in the other races of *sagitta*. Hands and feet, entirely dark brown.

Type.—Immature male (skin and skull), collected on Sipora Island, Mentawi Islands, West Sumatra, on 4th November, 1924 by C. Boden Kloss. Raffles Museum No. 2406.

Measurements.—Head and body, 140; tail, 160; hind-foot, 30; ear, 17 mm. (coll.).

Skull.—Total length, about 37; nasals, 9.9 by 5 (both); maxillary tooth row (alveoli,) 7.2 mm.

Remarks.—Although the tooth-row is complete, this specimen is immature and the skull, which in all essential characters seems to agree with that of *amoenus*, has almost certainly not reached its maximum length. In the skin, the under parts vary from buff to orange-buff, with a white patch on the chest. In all other specimens of this group I have seen, there is, irrespective of age, a marked colour-pattern at the base of the tail.

The material on which this new race is founded is admittedly poor, and in most cases would be insufficient to justify a new name, but the fauna of the Mentawi Islands is very specialized and in all other cases the indigenous mammals are distinct from those of the mainland, in most cases strikingly so. It is, therefore, misleading to continue to use a "blanket" name for such a sedentary form as the small flying squirrel of the islands, especially as there is a well-marked difference to be observed between the type (the only specimen available for comparison) and its nearest known allies.

Hylopetes sagitta amœnus (Mill.).
Sciuropterus amoenus Miller, Proc. U.S. Nat. Mus. XXXI, 1906, p. 264: Kundur Island, Rhio Archipelago.
Distr.—Kundur Island.

Hylopetes sagitta spadiceus (Blyth).[1]
Sciuropterus spadiceus Blyth, Journ. Asiat. Soc. Bengal, XVI, 1847, p. 867, pl. XXXVI: Arakan.
Distr.—Malay Peninsula.

Hylopetes sagitta belone (Thos.).
Sciuropterus (Hylopetes) belone Thomas, Ann. Mag. Nat. Hist. (8), II, 1908, p. 305: Terutau Island.
Distr.—Terutau Island, Straits of Malacca.

Hylopetes platyurus (Jent.). Jentink Flying Squirrel.
Sciuropterus platyurus Jentink, Notes Leyd. Mus. XII, 1890, p. 145, pl. VII, figs. 7, 8: Deli, North-East Sumatra.
Distr.—Malay States; Sumatra.

Hylopetes thomasi (Hose).[2] Thomas Flying Squirrel.
Petaurista Thomasi Hose, Ann. Mag. Nat. Hist. (7), 1900, p. 24: Silat River, Sarawak.
Distr.—Borneo.

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[1] *Hylopetes.* Paucity of material has been, chiefly, responsible for the confusion in the identification of the small *Hylopetes* of the Malay Peninsula which have in papers by various authors been regarded as *sagitta, lepidus, belone, spadiceus,* and once, I suspect, as *phayrei.* Some fresh specimens collected by Mr. E. Seimund show quite clearly that two species exist side by side. These are alike in colour, but differ noticeably in size. The larger form agrees with the types of *spadiceus* with which it has been compared. Adults give the following measurements.—head and body, 126–146; tail, 118–137; hind-foot, 26–28; ear, 16–20; *skull,* greatest length, 35·2–37·1; greatest width, 21·8–22·4; upper tooth-row (alveoli) 6·8–7·5 mm. I have seen numerous specimens from Peninsular Siam (Bangnara) and the west coast Malay States. With this form topotypical *belone* from Terutau Island in the Straits of Malacca is almost identical. In size series of the two forms are inseparable, but *belone* can be maintained as an insular race characterized by brighter, more cinnamon colour. *Spadiceus* is deeper and darker in colour on the upper parts which are more mixed with black and less solidly rufous than in *belone.*

The smaller Malayan species agrees exactly with the description of the Sumatran *platyurus,* but no direct comparison has been possible. I have two specimens from Perak and Selangor, but in neither is the skull complete. The measurements are.—head and body, 124; tail, 95; hind-foot, 21–23·5; ear, 16: *skull,* greatest width, 20·4; upper tooth-row (alveoli) 6–6·3 mm. Both specimens are less bright at the base of the tail than any example of *spadiceus* or *belone* before me. In Journ. Siam Soc. Nat. Hist. Suppl. X, I, 1935, p. 48 my "*belone*" is really *spadiceus* and my "*spadiceus*" is the species I now call *platyurus.* In P.Z.S. 1900, p. 353 Flower's *sagitta* and *lepidus* refer to either *spadiceus* or *platyurus,* or to both forms, but the "*sagitta*" from Penang seems to be *Iomys horsfieldii.* Bonhote's "*phayrei*" in P.Z.S. 1900, p. 876 is, I believe, *spadiceus* or *platyurus.*

Specimens agreeing with *caroli* occur in Sarawak, side by side with *harrisoni* which latter form is extremely close to *everetti.*

[2] *H. thomasi.* A very distinct, large, and curiously isolated form.

Genus PETINOMYS Thomas, 1908.

Petinomys hageni. Hagen Flying Squirrel.

Petinomys hageni hageni (Jent.).
Sciuropterus hageni Jentink, Notes Leyd. Mus. XI, 1888, p. 26: Deli, North-East Sumatra.
Distr.—Sumatra.

Petinomys hageni lugens (Thos.).
Sciuropterus lugens Thomas, Ann. Mus. Stor. Nat. Gen. XIV, 1895, p. 666: Sipora Island.
Distr.—Sipora Island, Mentawi Islands, West Sumatra.

Petinomys hageni mærens (Mill.).
Sciuropterus maerens Miller, Smiths. Misc. Coll. XLV, 1903, p. 26: North Pagi Island.
Distr.—North Pagi Island, Mentawi Islands, West Sumatra.

Petinomys setosus (Temm.). Temminck Flying Squirrel.
Pteromys (Sciuropterus) setosus Temminck in Faun. Japan., Mamm. 1842–5, p. 49: Padang, West Sumatra.
Distr.—Sumatra; Borneo.

Petinomys vordermanni.[1] Vordermann Flying Squirrel.

Petinomys vordermanni vordermanni (Jent.).
Sciuropterus vordermanni Jentink, Notes Leyd. Mus. XII, 1890, p. 150: Billiton Island.
Dist.—Billiton Island; Galang Island, Rhio Archipelago.

Petinomys vordermanni phipsoni (Thos.).
Pteromys (Petinomys) phipsoni Thomas, Journ. Bomb. Nat. Hist. Soc. XXIV, 1916, p. 422: Tenasserim village.
Distr.—Malay Peninsula.

Petinomys bartelsi Chas.
Petinomys bartelsi Chasen, Treubia, XVII, 1939, p. 185: Mt. Pangrango, West Java.
Distr.—Java.

Petinomys genibarbis. Whiskered Flying Squirrel.

Petinomys genibarbis genibarbis (Horsf.).
Pteromys genibarbis Horsfield, Zool. Res. in Java (4), 1822, description and plate: Java.
Distr.—Java; Sumatra.

Petinomys genibarbis malaccanus (Thos.).
Sciuropterus genibarbis malaccanus Thomas, Ann. Mag. Nat. Hist. (8), II, 1908, p. 304: Malacca.
Distr.—Malay States.

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[1] *P. phipsoni* and *P. vordermanni* are very much alike, but the northern form is rather larger and not quite so bright in colour: both are, perhaps, geographical representatives of *setosus* which is, however, considerably smaller.

Petinomys genibarbis borneoensis (Thos.).
Sciuropterus genibarbis borneoensis Thomas, Ann. Mag. Nat. Hist. (8), II, 1908, p. 304: Bakong River, Baram, Sarawak.
Distr.—Borneo.

Genus AEROMYS Rob. and Kl., 1915.

Aeromys tephromelas. Large Black Flying Squirrel.

Aeromys tephromelas tephromelas (Günth.).
Pteromys tephromelas Günther, Proc. Zool. Soc. 1873, p. 413, pl. XXXVII: Penang Island.
Distr.—Malay States.

Aeromys tephromelas phæomelas (Günth.).
Pteromys phaeomelas Günther, Proc. Zool. Soc. 1873, p. 413: Borneo.
Distr.—Borneo.

Aeromys tephromelas bartelsi (Sody).
Petaurista bartelsi Sody, Natuur. Tjid. XCVI, 1936, p. 146: Pematang Siantar, Deli district, North-East Sumatra.
Distr.—Sumatra.

Genus RATUFA Gray, 1867.[1]

Ratufa bicolor. Black Giant Squirrel.

Ratufa bicolor bicolor (Sparrm.).
Sciurus bicolor Sparrmann, Götheborg. Samhalle Hand. (Wet. Afd.), I, 1778, p. 70: Anjer, West Java.
Sciurus javensis Zimm., Geog. Gesch. II, 1780, p. 342: Java.
Sciurus Leschenaultii Desmar., Ency. Meth. (Mamm.) (2), 1822, p. 335: Java.
Sciurus humeralis Coul., Mém. Soc. Sci. Nat. Neuchatel, I, 1835 (1836) p. 122: Java.
Sciurus bicolor var. *Sondaica* Müll. and Schleg., Verhand. nat. gesch. Nederl., Mamm. 1844, p. 85: Java.
Ratufa bicolor major Mill., Proc. Biol. Soc. Wash. XXIV, 1911, p. 28: Tjibodas, Gedeh, West Java, 5,000 ft.
Distr.—Java (part).

Ratufa bicolor albiceps (Desmar.).
Sciurus albiceps Desmarest, Nouv. Dict. Hist. Nat. ed. 2, X, 1817, p. 105: East Java.
Distr.—Java (part).

Ratufa bicolor baliensis Thos.
Ratufa bicolor baliensis Thomas, Ann. Mag. Nat. Hist. (8), XI, 1913, p. 506: Bali, coast level.
Distr.—Bali.

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[1] *Ratufa.* Revisions: Bonhote, Ann. Mag. Nat. Hist. (7), V, 1900, p. 490; Wrought., Journ. Bomb. Nat. Hist. Soc. 1910, p. 880.

Ratufa bicolor peninsulæ (Mill.).
Sciurus melanopepla peninsulae Miller, Smiths. Misc. Coll. LXI, No. 21, 1913, p. 25: Lay Song Hong, Trang, Peninsular Siam.
Sciurus bicolor var. *Indica* Müll. and Schleg., Verh. nat. gesch. Nederl., Mamm. 1844, p. 85: Malacca (not Erxl. 1777).
Distr.—Malay Peninsula.

Ratufa bicolor melanopepla Mill.
Ratufa melanopepla Miller, Proc. Acad. Sci. Wash. II, 1900, p. 71: Telibon Island.
Distr.—Telibon Island, Trang, Peninsular Siam.

Ratufa bicolor phæopepla Mill.
Ratufa phaeopepla Miller, Smiths. Misc. Coll. LXI, No. 21, 1913, p. 25: Sungai Balik, South Tenasserim.
Distr.—Peninsular Siam (North).

Ratufa bicolor fretensis Thos. and Wrought.
Ratufa melanopepla fretensis Thomas and Wroughton, Ann. Mag. Nat. Hist. (8), IV, 1909, p. 535: Langkawi Island.
Distr.—Langkawi and Terutau Islands, Straits of Malacca.

Ratufa bicolor penangensis Rob. and Kl.
Ratufa melanopepla penangensis Robinson and Kloss, Journ. Fed. Malay States Mus. IV, 1911, p. 245: Penang Island.
Distr.—Penang Island, Straits of Malacca.

Ratufa bicolor dicolorata Rob. and Kl.
Ratufa melanopepla dicolorata Robinson and Kloss, Ann. Mag. Nat. Hist. (8), XIII, 1914, p. 227: Koh (Island) Samui.
Distr.—Islands of Samui and Pennan, Bandon Bight, North-East Malay Peninsula.

Ratufa bicolor tiomanensis Mill.
Ratufa tiomanensis Miller, Proc. Acad. Sci. Wash. II, 1900, p. 216: Tioman Island.
Distr.—Tioman Island, east coast Malay Peninsula.

Ratufa bicolor palliata Mill.
Ratufa palliata Miller, Proc. Acad. Nat. Sci. Philad. 1902, p. 147: Indragiri River, East Sumatra.
Distr.—Sumatra.

Ratufa bicolor lænata Mill.
Ratufa laenata Miller, Proc. U.S. Nat. Mus. XXVI, 1903, p. 449: Tuangku Island, Banjak Islands.
Distr.—Tuangku Island, Banjak Islands, West Sumatra.

Ratufa bicolor batuana Lyon.
Ratufa palliata batuana Lyon, Proc. U.S. Nat. Mus. LII, 1916, p. 445: Tana Bala Island.
Distr.—Tana Bala and Tana Masa Islands, Batu Islands, West Sumatra.

Ratufa bicolor angusticeps Mill.
Ratufa angusticeps Miller, Proc. Wash. Acad. Sci. III, 1901, p. 130: Lingung Island.
Distr.—Lingung Island, near Bunguran Island, North Natuna Islands.

Ratufa bicolor anambæ Mill.
Ratufa anambae Miller, Proc. Acad. Sci. Wash. II, 1900, p. 215: Jimaja Island.
Distr.—Jimaja Island, Anamba Islands.

Ratufa affinis. Cream-coloured Giant Squirrel.

Ratufa affinis affinis (Raffles).
Sciurus affinis Raffles, Trans. Linn. Soc. XIII, 1821, p. 259: Singapore Island.
Distr.—Singapore Island.

Ratufa affinis johorensis Rob. and Kl.
Ratufa affinis johorensis Robinson and Kloss, Journ. Fed. Malay States Mus. IV, 1911, p. 244: Padang Tuan, Segamat, North Johore.
Distr.—Malay States (part).

Ratufa affinis auriventer (Is. Geoff.).
Sciurus auriventer Is. Geoffroy in Belanger, Voy. Indes Orient (2), 1831, p. 150: "Java" error=Malacca.
Distr.—Malay States (part).

Ratufa affinis interposita Kl.
Ratufa affinis interposita Kloss, Bull. Raffles Mus. 7, 1932, p. 2: Ulu Gombak, Selangor, Malay States.
Distr.—Malay States (part).

Ratufa affinis frontalis Kl.
Ratufa affinis frontalis Kloss, Bull. Raffles Mus. 7, 1932, p. 2: Taiping, Perak, Malay States.
Distr.—Malay States (part).

Ratufa affinis pyrsonota Mill.
Ratufa pyrsonota Miller, Proc. Acad. Sci. II, 1900, p. 75: Trang, Peninsular Siam.
Distr.—Malay Peninsula (part).

Ratufa affinis hypoleucos (Horsf.).
Sciurus hypoleucos Horsfield, Zool. Res. in Java, 1823: Bencoolen, West Sumatra.
Distr.—Sumatra (part).

Ratufa affinis arusinus Lyon.
Ratufa arusinus Lyon, Proc. U.S. Nat. Mus. XXXII, 1907, p. 442: Aru Bay, North-East Sumatra.
Distr.—Sumatra (part).

Ratufa affinis catemana Lyon.
Ratufa catemana Lyon, Proc. U.S. Nat. Mus. XXXII, 1907, p. 443: Kateman River, South-East Sumatra.
Distr.—Sumatra (part).

Ratufa affinis nigrescens Mill.

Ratufa nigrescens Miller, Proc. U.S. Nat. Mus. XXVI, 1903, p. 448: Mansalar Island.

Distr.—Mansalar Island, Tapanuli Bay, West Sumatra.

Ratufa affinis femoralis Mill.

Ratufa femoralis Miller, Proc. U.S. Nat. Mus. XXVI, 1903, p. 447: Tuangku Island.

Distr.—Tuangku Island, Banjak Islands, West Sumatra.

Ratufa affinis balæ Mill.

Ratufa balae Miller, Smiths. Misc. Coll. XLV, 1903, p. 6: Tana Bala Island.

Distr.—Tana Bala Island, Batu Islands, West Sumatra.

Ratufa affinis masæ Mill.

Ratufa masae Miller, Smiths. Misc. Coll. XLV, 1905, p. 7: Tana Masa Island.

Distr.—Tana Masa Island, Batu Islands, West Sumatra.

Ratufa affinis piniensis Mill.

Ratufa piniensis Miller, Smiths. Misc. Coll. XLV, 1903, p. 7: Pinie Island.

Distr.—Pinie Island, Batu Islands, West Sumatra.

Ratufa affinis conspicua Mill.

Ratufa conspicua Miller, Smiths. Misc. Coll. XLV, 1903, p. 5: Bintang Island.

Distr.—Bintang Island, Rhio Archipelago.

Ratufa affinis confinis Mill.

Ratufa confinis Miller, Proc. U.S. Nat. Mus. XXXI, 1906, p. 259: Sinkep Island.

Distr.—Sinkep Island, Lingga Archipelago.

Ratufa affinis condurensis Mill.

Ratufa condurensis Miller, Proc. U.S. Nat. Mus. XXXI, 1906, p. 258: Kundur Island.

Distr.—Kundur Island, Rhio Archipelago.

Ratufa affinis carimonensis Mill.

Ratufa carimonensis Miller, Proc. U.S. Nat. Mus. XXXI, 1906, p. 257: Karimon Island.

Distr.—Karimon Island, Rhio Archipelago.

Ratufa affinis insignis Mill.

Ratufa insignis Miller, Smith. Misc. Coll. XLV, 1903, p. 4: Sugi Island.

Distr.—Sugi Island, Rhio Archipelago.

Ratufa affinis bulana Lyon.
Ratufa bulana Lyon, Proc. U.S. Nat. Mus. XXXVI, 1909, p. 482: Bulan Island.
Distr.—Bulan Island, Rhio Archipelago.[1]

Ratufa affinis notabilis Mill.
Ratufa notabilis Miller, Proc. Acad. Nat. Sci. Philad. 1902, p. 150: Lingga Island.
Distr.—Lingga Island, Lingga Archipelago.

Ratufa affinis bancana Lyon.
Ratufa polia bancana Lyon, Proc. U.S. Nat. Mus. XXXI, 1906, p. 587: Banka Island.
Distr.—Banka Island.

Ratufa affinis polia Lyon.
Ratufa polia Lyon, Proc. U.S. Nat. Mus. XXXI, 1906, p. 585: Billiton Island.
Distr.—Billiton Island.

Ratufa affinis nanogigas (Thos. and Hart.).
Sciurus bicolor nanogigas Thomas and Hartert, Nov. Zool. II, 1895, p. 491: Laut Island.
Distr.—Laut Island, North Natuna Islands.

Ratufa affinis bunguranensis (Thos. and Hart.).
Sciurus bicolor bunguranensis Thomas and Hartert, Nov. Zool. I, 1894, p. 658: Bunguran Island.
Distr.—Bunguran Island, North Natuna Islands.

Ratufa affinis sirhassenensis Bonh.
Ratufa ephippium sirhassenensis Bonhote, Ann. Mag. Nat. Hist. (7), V, 1900, p. 498: Sirhassen Island.
Distr.—Sirhassen Island, South Natuna Islands.

Ratufa affinis banguei Chas. and Kl.
Ratufa affinis banguei Chasen and Kloss, Bull. Raffles Mus. 6, 1931, p. 22: Banguey Island, North Borneo.
Distr.—Banguey Island, British North Borneo.

Ratufa affinis sandakanensis Bonh.
Ratufa ephippium sandakanensis Bonhote, Ann. Mag. Nat. Hist. (7), V, 1900, p. 497: Sandakan, British North Borneo.
Ratufa ephippium lumholzi Loennb., Ann. Mag. Nat. Hist. (9), XVI, 1925, p. 514: Pipoh Bulungan, North-East Dutch Borneo.
Distr.—Borneo (part).

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[1] *Ratufa affinis.* A form of this species occurs on Batam Island but no specimens have been examined. If not a distinct form it is most likely to be *R. a. bulana.* A single specimen from the tiny island of Talang, south of Bintang Island has a very extensive white muzzle and probably represents an undescribed form.

Ratufa affinis baramensis Bonh.

Ratufa ephippium baramensis Bonhote, Ann. Mag. Nat. Hist. (7), V, 1900, p. 496: Baram District, Sarawak.

Ratufa ephippium dulitensis Loennb. and Mjoeb., Ann. Mag. Nat. Hist. (9), XVI, 1925, p. 514: foot of Mt. Dulit, Sarawak.

Distr.—Borneo (part).

Ratufa affinis cothurnata Lyon.

Ratufa cothurnata Lyon, Proc. U.S. Nat. Mus. XL, 1911, p. 93: Mt. Palung near Sukadana, West Borneo.

Distr.—Borneo (part).

Ratufa affinis ephippium (S. Müll.).

Sciurus ephippium S. Müller, Tijdschr. nat. geschied, physiol. V (1 and 2), 1838, p. 147: South-East Borneo (low country).

Distr.—Borneo (part).

Ratufa affinis griseicollis Lyon.

Ratufa griseicollis Lyon, Proc. U.S. Nat. Mus. XL, 1911, p. 94: Panebangan Island.

Distr.—Panebangan Island, West Borneo.

Ratufa affinis vittata Lyon.

Ratufa vittata Lyon, Proc. U.S. Nat. Mus. XL, 1911, p. 94: Laut Island.

Distr.—Laut Island, South-East Borneo.

Ratufa affinis vittatula Lyon.

Ratufa vittatula Lyon, Proc. U.S. Nat. Mus. XL, 1911, p. 95: Sebuku Island.

Distr.—Sebuku Island, South-East Borneo.

Genus SCIURUS Linn. 1758.[1]

Sciurus caniceps. Forest Squirrel.

[**Sciurus caniceps caniceps Gray.**

Sciurus caniceps Gray, Ann. Mag. Nat. Hist. X, 1842, p. 263: Bhutan, error, *subst.* North Tenasserim *(Rob. and Kloss,* 1918).

Distr.—Extralimital.]

Sciurus caniceps davisoni Bonh.

Sciurus epomophorus Davisoni Bonhote, Ann. Mag. Nat. Hist. (7), VII, 1901, p. 273: Bankachon, South Tenasserim.

Distr.—Peninsular Siam (north).

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[1] *Sciurus.* For genus-splitters *Callosciurus* Gray, 1867, can be used for *concolor, erythraeus, notatus, nigrovittatus,* and *prevosti. Tomeutes* Thos., 1915, would include *melanogaster* (!), *tenuis, brookei, lowii, jentinki* and *hippurus.*

Sciurus caniceps milleri Rob. and Wrought.

Sciurus epomophorus milleri Robinson and Wroughton, Journ. Fed. Malay States Mus. IV, 1911, p. 233: Trang, Peninsular Siam.

Distr.—Malay Peninsula (Trang to Kedah).

Sciurus caniceps concolor Blyth.

Sciurus concolor Blyth, Journ. Asiat. Soc. Beng. XXIV, 1855, p. 474: Malacca.

Callosciurus erubescens Cabrera, Bol. de la Real. Soc. Espan. de Hist. Nat. XVII, 1917, p. 518: Selangor.

Distr.—Malay Peninsula (Patani southwards).

Sciurus caniceps tacopius (Thos. and Rob.).

Callosciurus epomophorus tacopius Thomas and Robinson, Ann. Mag. Nat. Hist. (9), VII, 1921, p. 121: Koh Rah.

Distr.—Koh (Island) Rah, Takopah, west coast Peninsular Siam, 8° 50′ N.

Sciurus caniceps epomophorus Bonh.

Sciurus epomophorus Bonhote, Ann. Mag. Nat. Hist. (7), VII, 1901, p. 272: Junk Seylon.

Distr.—Junk Seylon, and a small length of the opposite coast.

Sciurus caniceps panjius (Thos. and Rob.).

Callosciurus epomophorus panjius Thomas and Robinson, Ann. Mag. Nat. Hist. (9), VII, 1921, p. 119: Panjang Island.

Distr.—Panjang Island, east of Junk Seylon, Peninsular Siam, 8° 0′ to 8° 7′ N.

Sciurus caniceps panjioli (Thos. and Rob.).

Callosciurus epomophorus panjioli Thomas and Robinson, Ann. Mag. Nat. Hist. (9), VII, 1921, p. 120: Panjang Anak Island.

Distr.—Panjang Anak Island, north of Panjang Island, Peninsular Siam, 8° 8′ N.

Sciurus caniceps nakanus (Thos. and Rob.).

Callosciurus epomophorus nakanus Thomas and Robinson, Ann. Mag. Nat. Hist. (9), VII, 1921, p. 119: Koh (Island) Naka.

Distr.—Island of Naka, between Junk Seylon and Panjang Island, 8° 4′ N.

Sciurus caniceps mapravis (Thos. and Rob.).

Callosciurus epomophorus mapravis Thomas and Robinson, Ann. Mag. Nat. Hist. (9), VII, 1921, p. 120: Koh (Island) Maprau.

Distr.—Maprau Island, between Junk Seylon and the south end of Panjang Island, 7° 58′ N.

Sciurus caniceps pipidonis (Thos. and Rob.).

Callosciurus epomophorus pipidonis Thomas and Robinson, Ann. Mag. Nat. Hist. (9), VII, 1921, p. 121: Koh (Island) Pipidon.

Distr.—Island of Pipidon, Peninsular Siam, 7° 45′ N.

Sciurus caniceps telibius (Thos. and Rob.).
Callosciurus concolor telibius Thomas and Robinson, Ann. Mag. Nat. Hist. (9), VII, 1921, p. 121: Pulau (Island) Telibun.
Distr.—Island of Telibun, Peninsular Siam, 7° 18′ N.

Sciurus caniceps moheius (Thos. and Rob.).
Callosciurus moheius Thomas and Robinson, Ann. Mag. Nat. Hist. (9), VII, 1921, p. 122: Pulau (Island) Mohea, North.
Distr.—North Mohea Island, west coast Peninsular Siam, 7° 14′ N.

Sciurus caniceps mohillius (Thos. and Rob.).
Callosciurus moheius mohillius Thomas and Robinson, Ann. Mag. Nat. Hist. (9), VII, 1921, p. 122: Pulau (Island) Mohea, South.
Distr.—South Mohea Island, west coast Peninsular Siam, 7° 13′ N.

Sciurus caniceps adangensis Mill.
Sciurus adangensis Miller, Smiths. Misc. Coll. XLV, 1903, p. 17: Adang Island.
Distr.—Adang Island, Butang Archipelago, Straits of Malacca.

Sciurus caniceps terutavensis Thos. and Wrought.
Sciurus concolor terutavensis Thomas and Wroughton, Ann. Mag. Nat. Hist. (8), IV, 1909, p. 535: Terutau Island.
Distr.—Terutau Island, Straits of Malacca.

Sciurus caniceps lancavensis Mill.
Sciurus lancavensis Miller, Smiths. Misc. Coll. XLV, 1903, p. 16: Langkawi Island.
Distr.—Langkawi Islands, Straits of Malacca.

Sciurus caniceps samuiensis Rob. and Kl.
Sciurus concolor samuiensis Robinson and Kloss, Ann. Mag. Nat. Hist. (8), XIII, 1914, p. 226: Koh (Island) Samui.
Distr.—Samui Island, off Bandon, North-East Malay Peninsula.

Sciurus concolor fallax Rob. and Kl.
Sciurus concolor fallax Robinson and Kloss, Ann. Mag. Nat. Hist. (8), XIII, 1914, p. 225: Koh (Island) Pennan.
Distr.—Pennan Island, off Bandon, North-East Malay Peninsula.

Sciurus erythræus.[1] Pallas Squirrel.

[**Sciurus erythræus erythræus Pall.**
Sciurus erythraeus P. S. Pallas, N. sp. Quad. II, 1779, p. 377: probably Assam.
Distr.—Extralimital.]

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[1] *Sciurus erythraeus.* Revision: Bonh. Ann. Mag. Nat. Hist. (7), VII, 1901, p. 160.

Sciurus erythræus rubeculus Mill.

Sciurus rubeculus Miller, Smiths. Misc. Coll. XLV, 1903, p. 22: Trang, Peninsular Siam.

Distr.—Peninsular Siam.

Sciurus erythræus youngi Rob. and Kl.

Sciurus erythraeus youngi Robinson and Kloss, Ann. Mag. Nat. Hist. (8), XIII, 1914, p. 224: Mt. Tahan, Pahang.

Distr.—Malay States.

Sciurus prevostii.[1] Prevost Squirrel.

Sciurus prevostii prevostii Desm.

Sciurus prevostii Desmarest, Ency. Méth. (Mamm.) 1822, p. 335: Settlement of Malacca.

Sciurus rafflesii var. *Indica* Müll. and Schleg., in Temm., Verh. nat. gesch. Ned. overz. bezitt., Zool. 1844, p. 86: Malacca. (not *S. indicus* Exl., 1777).

Distr.—Malay Peninsula (part: approx. south and east).

Sciurus prevostii wrayi Kl.

Sciurus prevostii wrayi Kloss, Journ. Fed. Malay States Mus. IV, 1910, p. 148: Kuala Lipis, Pahang.

Distr.—Malay Peninsula (part; approx. north and west).

Sciurus prevostii humei Bonh.

Sciurus prevostii Humei Bonhote, Ann. Mag. Nat. Hist. (7), VII, 1901, p. 170: Klang, Selangor.

Distr.—Malay Peninsula (part: approx. inland central).

Sciurus prevostii rafflesii Vig. and Horsf.

Sciurus Rafflesii Vigors and Horsfield, Zool. Journ. IV, 1828, p. 113, pl. IV: Sumatra, probably Bencoolen, West Sumatra.

? *Sciurus redimitus* Boon Mesch, N. Verh. Ned. Inst. Amster. II. 1829, p. 243, pl.: Sumatra (Schlegel).

Sciurus rufogularis Gray, Ann. Mag. Nat. Hist. X, 1842, p. 263: "China", error, *subst.* Sumatra.

Sciurus prevostii var. *sumatranus* Schlegel, Ned. Tijdschr. 1863, p. 25: Sumatra.

Distr.—Sumatra (part).

Sciurus prevostii piceus Peters.

Sciurus piceus Peters, Proc. Zool. Soc. 1866, p. 429: Tenasserim, error, *subst.* North Sumatra.

Sciurus erebus Mill., Proc. U.S. Nat. Mus. XXVI, 1903, p. 456: Tapanuli Bay, North-West Sumatra.

Distr.—Sumatra (part).

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[1] *Sciurus prevostii.* Revisions: Bonh., Ann. Mag. Nat. Hist. (7), VII, 1901, p. 167; for notes on the black and chestnut forms *see* Chas. and Kl., Journ. Mal. Br. Roy. Asiat. Soc. 1925, p. 97; for the Bornean races, Banks, Proc. Zool. Soc. 1931, p. 1335; Chas. and Kl., Bull. Raff. Mus. 6, 1931, p. 22; Chas., Treubia, XV, 1935, p. 5. *S. p. harrisoni* and *rafflesii* are said by Stone and Rehn (1902) to occur together on Gunong Sugi in South Sumatra, but I suggest that this needs confirmation although it is of course well known that *prevostii* races sometimes occur so close together that two can be collected in a day.

Sciurus prevostii nyx Lyon.
Sciurus nyx Lyon, Proc. U.S. Nat. Mus. XXXIV, 1907, p. 658: Rupat Island, East Sumatra.
Distr.—Rupat Island, East Sumatra.

Sciurus prevostii penialius Lyon.
Sciurus melanops penialius Lyon, Proc. U.S. Nat. Mus. XXXIV, 1908, p. 637: Penjalei Island.
Distr.—Penjalei Island, East Sumatra.

Sciurus prevostii melanops Mill.
Sciurus melanops Miller, Proc. Acad. Nat. Sci. Philad. 1902, p. 151: Indragiri River, East Sumatra.
Distr.—Sumatra (part).

* **Sciurus prevostii harrisoni Stone and Rehn.**
Sciurus prevostii harrisoni Stone and Rehn, Proc. Acad. Nat. Sci. Philad. 1902, p. 132: Gunong Sugi, Lampongs, South Sumatra.
Distr.—Sumatra (part).

Sciurus prevostii carimonensis Mill.
Sciurus carimonensis Miller, Proc. U.S. Nat. Mus. XXXI, 1906, p. 261: Great Karimon Island.
Distr.—Great Karimon Island, Rhio Archipelago.

Sciurus prevostii condurensis Mill.
Sciurus condurensis Miller, Proc. U.S. Nat. Mus. XXXI, 1906, p. 260: Kundur Island.
Distr.—Kundur Island, Rhio Archipelago.

Sciurus prevostii bangkanus Schleg.
Sciurus prevostii var. *bangkanus* Schlegel, Ned. Tijdschr. Dierk. I, 1863, p. 26: Banka Island.
Distr.—Banka Island.

Sciurus prevostii mendanauus Lyon.
Sciurus mendanauus Lyon, Proc. U.S. Nat. Mus. XXXI, 1906, p. 589: Mendanau Island.
Distr.—Mendanau Island, west of Billiton Island.

Sciurus prevostii palustris Lyon.
Sciurus borneoensis palustris Lyon, Proc. U.S. Nat. Mus. XXXIII, 1907, p. 552: North bank of Kupuas River, West Borneo.
Distr.—Borneo (part).

Sciurus prevostii borneoensis Müll. and Schleg.
Sciurus rafflesii var. *Borneoensis* Müller and Schlegel, in Temm., Verh. nat. gesch. Ned. overz. bezitt. Zool. 1844, p. 86: Pontianak, West Borneo.
Distr.—Borneo (part).

Sciurus prevostii sarawakensis (Gray).
Macroxus sarawakensis Gray, Ann. Mag. Nat. Hist. XX, 1867, p. 277: Sarawak.
Sciurus prevostii kuchingensis Bonh., Ann. Mag. Nat. Hist. (7), VII, 1901, p. 170: Kuching, Sarawak.
Distr.—Borneo (part).

Sciurus prevostii sanggaus Lyon.
Sciurus sanggaus Lyon, Proc. U.S. Nat. Mus. XXXIII, 1907, p. 554: Sanggau, West Borneo.
Distr.—Borneo (part).

Sciurus prevostii atricapillus Schleg.
Sciurus atricapillus Schlegel, Ned. Tijdschr. Dierk. I, 1863, p. 27: Kapuas River, West Borneo.
Distr.—Borneo (part).

Sciurus prevostii carimatæ Mill.
Sciurus carimatae Miller, Proc. U.S. Nat. Mus. XXXI, 1906, p. 57: Karimata Island.
Distr.—Karimata Island, West Borneo.

Sciurus prevostii armalis Lyon.
Sciurus armalis Lyon, Proc. U.S. Nat. Mus. XL, 1911, p. 82: Panebangan Island.
Distr.—Panebangan Island, West Borneo.

Sciurus prevostii pelapius Lyon.
Sciurus pelapius Lyon, Proc. U.S. Nat. Mus. XL, 1911, p. 82: Pelapsis Island.
Distr.—Pelapsis Island, West Borneo.

Sciurus prevostii proserpinæ Lyon.
Sciurus proserpinae Lyon, Smiths. Misc. Coll. XLVIII, 1907, p. 275: Temaju Island.
Distr.—Temaju Island, West Borneo.

Sciurus prevostii caroli Bonh.
Sciurus caroli Bonhote, Ann. Mag. Nat. Hist. (7), VII, 1901, p. 173: Marudi River, Baram, Sarawak.
Distr.—Borneo (part).

Sciurus prevostii banksi Chas.
Sciurus prevosti banksi Chasen, Bull. Raff. Mus. 8, 1933, p. 195: Baram district, Sarawak.
Distr.—Borneo (part).

Sciurus prevostii suffusus Bonh.
Sciurus baluensis suffusus Bonhote, Ann. Mag. Nat. Hist. (7), VII, 1901, p. 175: Tutong River, North-West Borneo.
Distr.—Borneo (part).

Sciurus prevostii griseicauda Bonh.
Sciurus caroli griseicauda Bonhote, Ann. Mag. Nat. Hist. (7), VII, 1901, p. 174: Mt. Kalulong, Baram, Sarawak.
Distr.—Borneo (part).

Sciurus prevostii baluensis Bonh.
Sciurus baluensis Bonhote, Ann. Mag. Nat. Hist. (7), VII, 1901, p. 174: Mt. Kinabalu, North Borneo.
Distr.—Borneo (part).

Sciurus prevostii baramensis Chas.[1]
Sciurus prevostii baramensis Chasen, Bull. Raff. Mus. 15, 1940, p. 131: Mt. Dulit, Sarawak.
Distr.—Borneo (part).

Sciurus prevostii atrox Mill.
Sciurus atricapillus atrox Miller, Smiths. Misc. Coll. LXI, 21, 1913, p. 23: Mt. Talisaian, Dutch South-East Borneo (near the coast in lat. 1° 50′ N.).
Distr.—Borneo (part).

Sciurus prevostii rufonigra Gray.
Sciurus rufonigra Gray, Ann. Mag. Nat. Hist. X, 1842, p. 263: Labuan Island, (*Chas. and Kl.* 1925).
Distr.—Labuan Island, North-West Borneo.

Sciurus prevostii pluto (Gray).
Macroxus pluto Gray, Ann. Mag. Nat. Hist. XX, 1867, p. 283: Sarawak (more probably from British North Borneo).
Distr.—Borneo (part).

Sciurus prevostii caedis Chas. and Kl.
Sciurus prevostii caedis Chasen and Kloss, Bull. Raff. Mus. 6, 1931, p. 25: Balambangan Island.
Distr.—Islands of Banguey and Balambangan, North Borneo.

Sciurus prevostii mimiculus Mill.
Sciurus mimiculus Miller, Proc. Wash. Acad. Sci. II, 1900, p. 219: Saint Barbe Island.
Distr.—Saint Barbe Island, South China Sea.

Sciurus prevostii navigator Bonh.
Sciurus prevostii navigator Bonhote, Ann. Mag. Nat. Hist. (7), VII, 1901, p. 171: Sirhassen Island.
Distr.—Islands of Sirhassen, Panjang and Subi, South Natuna Islands.

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[1] **Sciurus prevostii baramensis subsp. nov.**

Very close to *S. p. baluensis* from the higher levels of Mt. Kinabalu in British North Borneo, but the black tail mixed with red, a colour never more than faintly indicated in specimens from Mt. Kinabalu.

Type.—Adult male, skin and skull, collected on Mt. Dulit, Baram district, Sarawak, 5,000 ft. in October, 1891 by Charles Hose. Raffles Mus. No. 6415.

Remarks.—The difference between animals from the two mountains is not large, but it seems to be constant. Ten skins from Kinabalu have been compared with eight from Dulit.

Sciurus prevostii mimellus Mill.

Sciurus mimellus Miller, Proc. Wash. Acad. Sci. II, 1900, p. 18: Wai Island.

Distr.—Wai Island, Tambelan Islands.

Sciurus notatus.[1] Common Malay Squirrel: Plantain Squirrel.

Sciurus notatus notatus Bodd.

Sciurus notatus Boddaert, Elench. Anim. 1785, p. 119: West Java.

? *Sciurus dschinschicus* Gmel., in Linn., Syst. Nat. ed. 13, I, 1788, p. 151.

Sciurus badjing Kerr, Anim. Kingd. 1792, p. 262: West Java. (*Kloss, 1921*).

? *Sciurus ginginianus* Shaw, Gen. Zool. (Mamm.) II (1), 1801, p. 147.

Sciurus plantani Ljung, K. Vet. Akad. n. Handl. XXII, 1801, p. 99: West Java.

Sciurus bilineatus Geoff., N. Dict. H.N. ed. 2, X, 1817, p. 106: West Java (*Kloss, 1921*).

Sciurus Andrewsi Bonh., Ann. Mag. Nat. Hist. (7), VII, 1901, p. 456: Tjigombong, West Java.

Sciurus notatus balstoni Rob. and Wroughton, Journ. Fed. Malay States Mus. IV, 1911, p. 234: Tjilatjap, South Central Java.

Callosciurus notatus vanheurni Sody, Natuur. Tijd. Ned. Ind. 88, 1928, p. 327: Tjipanas, near Garoet, West Java.

Distr.—Java (part).

Sciurus notatus maduræ Thos.

Sciurus notatus madurae Thomas, Ann. Mag. Nat. Hist. (8), V, 1910, p. 386: Madura Island.

Sciurus notatus tamansari Kloss, Journ. Fed. Malay States Mus. X, 1921, p. 230: Idjen Massif, East Java, 1,600 ft.

Callosciurus notatus verbeeki Sody, Natuur. Tijd. Ned. Ind. 88, 1928, p. 330: Bandar, Padangan district, Rembang, Java.

Distr.—Java (part); Madura.

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[1] *Sciurus notatus.* Revisions: Bonhote, Ann. Mag. Nat. Hist. (7), VIII, 1901, p. 444; Lyon, Smiths. Misc. Coll. XLVIII, 1907, p. 277 (Sumatran forms only).

I have followed Dammerman in his treatment of the Javanese races of this squirrel (Treubia, XIII, 1931, p. 456). This author recognizes two races only, one in the East and another in the West of Java. He regards all other forms as intergradations or mere individual variations. "The line of demarcation between the two races runs probably from somewhere west of Cheribon to somewhere East of Tjilatjap. All along this line on either side we can expect intermediate forms. Moreover specimens from arid localities in the western part of Java may show the ochraceous discolouration, whereas those from moist areas in East Java will show a greyish suffusion." But see also, Sody, Natuur. Tijd. Ned. Ind. 1929, p. 325 and 1933, p. 81.

S. dschinschicus and *S. ginginianus* based on Sonnerat's "Ecuriel de Gingi" said to have come from Pondicherry probably refer to *notatus* squirrels. If so, the type locality is West Java (Kloss, Journ. Fed. Mal. States Mus. X, 1921, p. 231).

Sciurus notatus stresemanni Thos.

Sciurus notatus stresemanni Thomas, Ann. Mag. Nat. Hist. (8), XI, 1913, p. 505: Bali.

Distr.—Bali.

Sciurus notatus microtis Jent.

Sciurus (Rheithrosciurus) microtis Jentink, Notes Leyd. Mus. I, 1879, p. 40: Saleyer Island.

Distr.—Saleyer Island, Java Sea.

Sciurus notatus arendsis Lyon.

Sciurus arendsis, Lyon, Proc. U.S. Nat. Mus. XL, 1911, p. 87: Arends Island.

Distr.—Arends Island, Java Sea.

Sciurus notatus siriensis Lyon.

Sciurus siriensis Lyon, Proc. U.S. Nat. Mus. XL, 1911, p. 87: Mata Siri Island.

Distr.—Mata Siri Island, Java Sea.

Sciurus notatus miniatus Mill.

Sciurus notatus miniatus Miller, Proc, Acad. Sci. Wash. II, 1900, p. 79: Trang, Peninsular Siam.

Distr.—Malay Peninsula (south to North Johore on the west coast; south to about the Pahang River on the east coast; sporadic in South Johore.

Sciurus notatus peninsularis Mill.

Sciurus peninsularis Miller, Smiths. Misc. Coll. XLV, 1903, p. 10: north bank of Endau River, South-East Pahang.

Distr.—Malay States (part); Sumatra (south-east).

Sciurus notatus subluteus Thos. and Wrought.

Sciurus vittatus subluteus Thomas and Wroughton, Ann. Mag. Nat. Hist. (8), III, 1909, p. 440: Si Karang, South-East Johore.

Distr.—Malay States (extreme South-East Johore).

Sciurus notatus singapurensis (Rob.).

Callosciurus vittatus singapurensis Robinson, Journ. Fed. Malay States Mus. VII, 1916, p. 73: Singapore Island.

Distr.—Singapore Island.

Sciurus notatus lighti Chas. and Kl.

Sciurus vittatus lighti Chasen and Kloss, Journ. Mal. Br. Roy. Asiat. Soc. II, 1924, p. 58; Penang Island.

Distr.—Penang Island.

Sciurus notatus proteus Kl.

Sciurus vittatus proteus Kloss, Ann. Mag. Nat. Hist. (8), VII, 1911, p. 118: East Perhentian Island.

Distr.—East Perhentian Island, off Trengganu, Malay States.

Sciurus notatus perhentiani Kl.
Sciurus vittatus perhentiani Kloss, Ann. Mag. Nat. Hist. (8), VII, 1911, p. 118: West Perhentian Island.
Dist.—West Perhentian Island, off Trengganu, Malay States.

Sciurus notatus plasticus Kl.
Sciurus vittatus plasticus Kloss, Ann. Mag. Nat. Hist. (8), VII, 1911, p. 117: Great Redang Island.
Distr.—Great Redang Island, off Trengganu, Malay States.

Sciurus notatus scottii Kl.
Sciurus vittatus scottii, Kloss, Ann. Mag. Nat. Hist. (8), VII, 1911, p. 117: Little Redang Island (Bedung Island).
Distr.—Little Redang Island, off Trengganu, Malay States.

Sciurus notatus watsoni Kl.
Sciurus vittatus watsoni Kloss, Ann. Mag. Nat. Hist. (8), VII, 1911, p. 118: Lantinga Island.
Distr.—Lantinga Island, off Trengganu, Malay States.

Sciurus notatus guillemardi Kl.
Sciurus notatus guillemardi Kloss, Journ. Malay Br. Roy. Asiat. Soc. IV, 1926, p. 260: Tenggol Island.
Distr.—Tenggol Island, off Trengganu, Malay States.

Sciurus notatus tenuirostris Mill.
Sciurus tenuirostris Miller, Proc. Acad. Sci. Wash. II, 1900, p. 221: Tioman Island.
Distr.—Tioman Island, off Pahang, Malay States.

Sciurus notatus pemangilensis Mill.
Sciurus pemangilensis Miller, Smiths. Misc. Coll. XLV, 1903, p. 9: Pemanggil Island.
Distr.—Pemanggil Island, off Johore, Malay States.

Sciurus notatus aoris Mill.
Sciurus aoris Miller, Smiths. Misc. Coll. XLV, 1903, p. 10: Aor Island.
Distr.—Aor Island, off Johore, Malay States.

Sciurus notatus famulus Rob.
Sciurus vittatus famulus Robinson, Ann. Mag. Nat. Hist. (8), X, 1912, p. 592: Dayang Island.
Distr.—Dayang Island near Aor Island, off Johore, Malay States.

Sciurus notatus vittatus Raffles.
Sciurus vittatus Raffles, Trans. Linn. Soc. XIII, 1821, p. 259: Bencoolen, West Sumatra.
Sciurus bivittatus Desmar., Ency. Méth. (Mamm.), 2, 1822, p. 543: Sumatra.
Macroxus toupai Less., Man. Mamm. 1827, p. 238: Sumatra.
Sciurus vittatus tarussanus Lyon, Smiths. Misc. Coll. XLVIII, 1907, p. 279: Tarussan Bay, West Sumatra.
Distr.—Sumatra (south-west).

Sciurus notatus tapanulius Lyon.
Sciurus vittatus tapanulius Lyon, Smiths. Misc. Coll. XLVIII, 1907, p. 280: Tapanuli Bay, West Sumatra.
Distr.—Sumatra (north-west).

*** Sciurus notatus nicotianae (Sody).**
Callosciurus notatus nicotianae Sody, Natuur. Tijds. 1936, p. 217: Silalas, near Medan, Deli, North Sumatra.
Distr.—Sumatra (north-east).

Sciurus notatus rupatius Lyon.[1]
Sciurus notatus rupatius Lyon, Proc. U.S. Nat. Mus. XXXIV, 1908, p. 640: Rupat Island.
Distr.—Coastal islands of East Sumatra from Rupat to Tebing Tinggi.

Sciurus notatus stellaris Chas. and Kl.
Sciurus vittatus stellaris Chasen and Kloss, Journ. Malay Br. Roy. Asiat. Soc. II, 1924, p. 58: Bintang Island.
Distr.—Bintang Island, Rhio Archipelago.

Sciurus notatus nesiotes Thos. and Wrought.
Sciurus vittatus nesiotes Thomas and Wroughton, Ann. Mag. Nat. Hist. (8), III, 1909, p. 439; Batam Island.
Distr.—Batam and Galang Islands, Rhio Archipelago.

Sciurus notatus lunaris Chas. and Kl.
Sciurus vittatus lunaris Chasen and Kloss, Journ. Malay Br. Roy. Asiat. Soc. II, 1924, p. 58: Bulan Island.
Distr.—Bulan Island, Rhio Archipelago.

Sciurus notatus maporensis Rob.
Sciurus vittatus maporensis Robinson, Journ. Fed. Mal. States Mus. VII, 1916, p. 64: Mapor Island.
Distr.—Mapor Island, Rhio Archipelago.

Sciurus notatus tedongus Lyon.
Sciurus tedongus Lyon, Proc. U.S. Nat. Mus. XXXI, 1906, p. 591: Banka Island.
Distr.—Banka Island.

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[1] In the extreme south of the Malay Peninsula and in the maze of small islands a little further to the south this squirrel has been much split and I therefore reviewed anew the material in the Raffles Museum thinking that perhaps a reduction of the number of forms was possible but the described races seem to exist although all are very near to *peninsularis* and none is very well marked. The present situation is not satisfactory in that no race seems to have been compared with the neighbouring race, *rupatius*, an early name. The species also occurs on many other islands of the Rhio and Lingga Archipelagos (for certain on Karimon, Sugi, Sebang, Lingga, Penuba, Singkep and Sanglar and no doubt on all the others of more than a few acres in area) and the number of subspecies recognized at present is almost certainly too small. For the moment animals from all these localities must be regarded as *peninsularis*, but like specimens placed under this name from South-East Sumatra, it is doubtful if they are quite like true *peninsularis*.

Sciurus notatus billitonus Lyon.
Sciurus billitonus Lyon, Proc. U.S. Nat. Mus. XXXI, 1906, p. 593: Billiton Island.
Distr.—Billiton Island.

Sciurus notatus saturatus Mill.
Sciurus saturatus Proc. U.S. Nat. Mus. XXVI, 1903, p. 453: Mansalar Island.
Distr.—Mansalar Island, off Tapanuli Bay, West Sumatra.

Sciurus notatus pretiosus Mill.
Sciurus pretiosus Miller, Proc. U.S. Nat. Mus. XXVI, 1903, p. 454: Bangkaru Island.
Distr.—Bangkaru Island, Banjak Islands, West Sumatra.

Sciurus notatus ubericolor Mill.
Sciurus ubericolor Miller, Proc. U.S. Nat. Mus. XXVI, 1903, p. 455: Tuangku Island.
Distr.—Tuangku Island, Banjak Islands, West Sumatra.

Sciurus notatus ictericus Mill.
Sciurus ictericus Miller, Smiths. Misc. Coll. XLIV, 1903, p. 12: Tana Bala Island, Batu Islands.
Distr.—Batu Islands, West Sumatra.

Sciurus notatus anambensis Mill.
Sciurus anambensis Miller, Proc. Acad. Sci. Wash. II, 1900, p. 223: Siantan Island.
Distr.—Anamba Islands.

Sciurus notatus seraiæ Mill.
Sciurus seraiae Miller, Proc. Acad. Sci. Wash. III, 1901, p. 125: Seraia Island.
Distr.—Seraia Island, Natuna Islands.

Sciurus notatus rutiliventris Mill.
Sciurus rutiliventris Miller, Proc. Acad. Sci. Wash. III, 1901, p. 126: Midai Island.
Distr.—Midai and Sedanau Islands, Natuna Islands.

Sciurus notatus lautensis Mill.
Sciurus lautensis Miller, Proc. Acad. Sci. Wash III, 1901, p. 128: Laut Island.
Distr.—Laut Island, North Natuna Islands.

Sciurus notatus rubidiventris Mill.
Sciurus rubidiventris Miller, Proc. Acad. Sci. Wash. III, 1901, p. 127: Bunguran Island.
Distr.—Bunguran Island, North Natuna Islands.

Sciurus notatus lutescens Mill.

Sciurus lutescens Miller, Proc. Acad. Sci. Wash. III, 1901, p. 124: Sirhassen Island.

Distr.—Sirhassen and Berian Islands, South Natuna Islands.

Sciurus notatus abbottii Mill.

Sciurus abbottii Miller, Proc. Acad. Sci. Wash. II, 1900, p. 224: Big Tambelan Island.

Distr.—Tambelan Islands, South China Sea.

Sciurus notatus director Lyon.

Sciurus director Lyon, Proc. U.S. Nat. Mus. XXXVI, 1909, p. 509: Direction Island.

Distr.—Direction Island, South China Sea.

Sciurus notatus pannovianus Mill.

Sciurus pannovianus Miller, Smiths. Misc. Coll. XLIV, 1903, p. 11: Panau Island.

Distr.—Panau Island, Atas Islands, South China Sea.

Sciurus notatus dulitensis Bonh.

Sciurus vittatus dulitensis Bonhote, Ann. Mag. Nat. Hist. (7), VII, 1901, p. 451: Mt. Dulit, Sarawak, 1000 ft.

Distr.—Borneo (part).

Sciurus notatus dilutus Mill.

Sciurus dulitensis dilutus Miller, Smiths. Misc. Coll. LXI, No. 21, 1913, p. 23: Tanjong Batu, Dutch East Borneo, lat. 2° 15′ N.

Distr.—Borneo (part).

Sciurus notatus malawali Chas. and Kl.

Sciurus notatus malawali Chasen and Kloss, Bull. Raff. Mus. 6, 1931, p. 26: Mallewallé Island.

Distr.—Mallewallé Island, North Borneo.

Sciurus vittatus conipus Lyon.

Sciurus conipus Lyon, Proc. Biol. Soc. Wash. XXIV, 1911, p. 97: nom. nov. for *S. poliopus* Lyon (not Fitz., 1867), Proc. U.S. Nat. Mus. XL, 1911, p. 88: Pamukang Bay, South Borneo.

Distr.—Borneo (part).

Sciurus notatus serutus Mill.

Sciurus serutus Miller, Proc. U.S. Nat. Mus. XXXI, 1906, p. 58: Serutu Island.

Distr.—Serutu Island, Karimata Islands.

Sciurus notatus lamucotanus Lyon.

Sciurus lamucotanus Lyon, Proc. U.S. Nat. Mus. XL, 1911, p. 85: Lamukotan Island.

Distr.—Lamukotan Island, West Borneo.

Sciurus notatus datus Lyon.

Sciurus datus Lyon, Proc. U.S. Nat. Mus. XL, 1911, p. 86: Datu Island.

Distr.—Datu Island, West Borneo.

Sciurus notatus marinsularis Lyon.

Sciurus marinsularis Lyon, Proc. U.S. Nat. Mus. XL, 1911, p. 89: Laut Island.

Distr.—Laut Island, South-East Borneo.

Sciurus nigrovittatus.[1] Black-striped Squirrel.

Sciurus nigrovittatus nigrovittatus (Horsf.).

Sciurus nigrovittatus Horsfield, Zool. Res. Java, (7), 1823: West Java (*restr. Kloss, 1921*).

Sciurus grisei-venter, Is. Geoff., in Belang., Voy. Indes Orient, (2), 1831, p. 147: West Java (*restr., Kloss, 1921*).

? *Sciurus Diardii* Jent., Notes Leyd. Mus. I, 1879, p. 38: Island of Nusa Kambangan, south coast of Central Java.

Distr.—Java (part).

Sciurus nigrovittatus madsoedi (Sody).

Callosciurus nigrovittatus madsoedi Sody, Nat. Tijdschr. Ned. Ind. LXXXIX, 1929, p. 163: Mt. Moeria, Central Java, 480 m.

Distr.—Java (part).

Sciurus nigrovittatus besuki Kl.

Sciurus nigrovittatus besuki Kloss, Journ. Fed. Mal. States Mus. X, 1921, p. 231: Tamansari, Idjen Massif, East Java, 1,600 ft.

Distr.—Java (part).

Sciurus nigrovittatus bilimitatus Mill.

Sciurus bilimitatus Miller, Smiths. Misc. Coll. XLV, 1903, p. 8: Trengganu, Malay States.

Distr.—Malay States (north).

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[1] *Sciurus nigrovittatus.* Revision: Bonhote, Ann. Mag. Nat. Hist. (7), VII, 1901, p. 452; Rob. and Wrought., Journ. Fed. Mal. States Mus., IV, 1911, p. 166. Here again in dealing with the Javan forms Dr. Dammerman has taken a very broad view and in "Treubia", XIII, 1931, p. 462, has lumped extensively. With the cause of the variation I am not, at the moment, concerned: I know that there is much intergradation and even inosculation in the long island of Java. Nevertheless, I think most mammalogists would admit eastern and western races and two topotypes of *madsoedi* Sody, a form based on a long series, certainly confirm the characters given in the original description.

Sciurus nigrovittatus johorensis Rob. and Wrought.

Sciurus nigrovittatus johorensis Robinson and Wroughton, Journ. Fed. Malay States Mus. IV, 1911, p. 166: Pelepak, Johore.

Distr.—Malay States (south).

Sciurus nigrovittatus microrhynchus Kl.

Sciurus (bilimitatus) microrhynchus Kloss, Journ. Fed. Malay States Mus. II, 1908, p. 144: Tioman Island.

Distr.—Tioman Island, off Pahang, east coast Malay Peninsula.

Sciurus nigrovittatus orestes Thos.

Sciurus notatus orestes Thomas, Ann. Mag. Nat. Hist. (6), XV, 1895, p. 529: Mt. Dulit, Sarawak, 4,000 ft.

? *Sciurus atristriatus* Mill., Smiths. Misc. Coll. LXI, 21, 1913, p. 22: Dutch South-East Borneo.

Distr.—Borneo (part).

Sciurus nigrovittatus venetus Chas.[1]

Sciurus nigrovittatus venetus Chasen, Bull. Raffles Mus. 15, 1940, p. 139: Mt. Kinabalu, North Borneo, 3,300 ft.

Distr.—Borneo (part).

Sciurus nigrovittatus bocki Rob. and Wrought.

Sciurus nigrovittatus bocki Robinson and Wroughton, Journ. Fed. Malay States Mus. IV, 1911, p. 167: Pajo, Padang Highlands, Sumatra.

Distr.—Sumatra.

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[1] **Sciurus nigrovittatus venetus** subsp. nov.

Differs from exact topotypes of *S. n. orestes* of Mt. Dulit (above 3,000 ft.), in larger size (skull-length up to 44 mm.), paler under parts, and reduction of the black lateral stripe. No close comparison with *bocki* is needed.

Type.—Adult male, skin and skull, collected on Mt. Kinabalu (Kenokok, 3,300 ft.), British North Borneo, on 26th April, 1929 by F. N. Chasen, Raffles Museum No. 4184.

External measurements.—Head and body, 164; tail, 162; hind-foot, s.u. 38; ear, 15 mm.

Skull.—Greatest length, 43·2; condylo-basilar length 37; zygomatic breadth, 27·2; least interorbital breadth, 16·4; median nasal length, 12·4; upper molar row (alveoli), 7·9 mm.

Remarks.—Average measurements of *orestes* are given in the original description. Six skulls from Kinabalu have the greatest length 42–43·3 mm. Hind-foot, 36–40 mm. In the specimen from the highest altitude, 5,500 ft. the upper parts are much paler than in the others and the black lateral stripe is obsolete.

Sciurus nigrovittatus klossii Mill.

Sciurus klossii Miller, Proc. Acad. Sci. Wash. II, 1900, p. 225: Saddle Island.

Distr.—Saddle Island, Tambelan Islands.

Sciurus albescens.[1] Kloss Squirrel.

Sciurus albescens albescens Bonh.

Sciurus notatus albescens Bonhote, Ann. Mag. Nat. Hist. (7), VII, 1901, p. 446: Acheen, North Sumatra.

Distr.—Sumatra.

Sciurus albescens adamsi Kl.

Sciurus adamsi Kloss, Journ. Str. Br. Roy. Asiat. Soc. No. 83, 1921, p. 151: Long Mujan, about 150 miles up the Baram River, North Sarawak, 700–900 ft.

Distr.—Borneo.

Sciurus melanogaster.[2] Mentawi Squirrel.

Sciurus melanogaster melanogaster Thos.

Sciurus melanogaster Thomas, Ann. Mus. Civ. Stor. Nat. Genova, XIV, 1896, p. 668: Sipora Island.

Distr.—Sipora Island, Mentawi Islands, West Sumatra.

Sciurus melanogaster mentawi Chas. and Kl.

Sciurus melanogaster mentawi Chasen and Kloss, Proc. Zool. Soc. 1927, p. 822: Siberut Island.

Distr.—Siberut Island, Mentawi Islands, West Sumatra.

Sciurus melanogaster atratus Mill.

Sciurus atratus Miller, Smiths. Misc. Coll. XLV, 1903, p. 13: North Pagi Island.

Distr.—Pagi Islands, Mentawi Islands, West Sumatra.

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[1] *Sciurus albescens.* It was Kloss, in 1921, who first demonstrated that in Sarawak two distinct species of squirrels, almost exactly alike in external appearance, but distinguished chiefly by size, live side by side. Further material from other parts of Borneo, commented on in Bull. Raffles Mus. 6, 1931, p. 26, confirmed his conclusion, and I now see that in North Sumatra a similar situation obtains: furthermore, that an early name, originally used as a subspecies name for a form of *notatus* is really the prior name for the small species. *Adamsi* is very variable in the colour of the under parts, but it averages much paler, more buffy and orange, and less red than *albescens*. Also it has the black lateral stripes very much thinner, and the pale patches behind the ears more distinct, more buffy and less greyish in colour.

[2] *Sciurus melanogaster.* This form has been linked to *nigrovittatus* (Rob. and Wrought. 1911), and allied to *erythraeus* (Bonh., 1901), but I do not feel certain of the affinities.

Sciurus hippurus.[1] Horse-tailed Squirrel.

Sciurus hippurus hippurus Geoff.

Sciurus hippurus I. Geoffroy in C. Belanger, Voy. Indes-Orient. II, 1831, p. 149: Java, error, *subst.* Malacca *(Rob. and Kloss, 1918)*.

Sciurus rufogaster Gray, Ann. Mag. Nat. Hist. X, 1842, p. 263: Malacca.

Distr.—Malay Peninsula.

Sciurus hippurus hippurosus Lyon.

Sciurus hippurosus Lyon, Smiths. Misc. Coll. L., 1907, p. 26: Tarussan Bay, West Sumatra.

Distr.—Sumatra.

Sciurus hippurus hippurellus Lyon.

Sciurus hippurellus Lyon, Smiths. Misc. Coll. L. 1907, p. 27: Batu Ampar, Landak River, West Borneo.

Distr.—Borneo (part).

Sciurus hippurus borneensis (Gray).

Macroxus rufogaster var. *borneensis* J. E. Gray, Ann. Mag. Nat. Hist. (3), XX, 1867, p. 283: Sarawak.

Sciurus hippurus Grayi Bonhote, Ann. Mag. Nat. Hist. (7), VII, 1901, p. 71, footnote: *nom. nov.*

Distr.—Borneo (part).

Sciurus hippurus pryeri Thos.

Sciurus Pryeri Thomas, Ann. Mag. Nat. Hist. (6), X, 1892, p. 214: Sapugaia River, near Sandakan, British North Borneo.

Distr.—Borneo (part).

Sciurus hippurus inquinatus Thos.

Sciurus pryeri inquinatus Thomas, Journ. Bomb. Nat. Hist. Soc. XVIII, 1908, p. 247: Lawas River, Sarawak.

Distr.—Borneo (part).

Sciurus tenuis.[2] Slender Squirrel.

Sciurus tenuis tenuis Horsf.

Sciurus tenuis T. Horsfield, Zool. Researches Java, 1823: Singapore.

Distr.—Malay States (part); Sumatra (part); Lingga Island.

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[1] *Sciurus hippurus.* Revisions: Lyon, Smiths. Misc. Coll. L, 1907, p. 24; Chas. and Kl., Bull. Raffl. Mus. 6, 1931, p. 27.

[2] *Sciurus tenuis.* Specimens from various places in the Sumatran lowlands have been identified as *tenuis* by several authors, and in the absence of material the identifications are here accepted, but a series examined by me from the north of the island is *surdus.* In the north of the Malay States, *surdus* and *tenuis* meet. The former subspecies occurs at Kedah Peak and at Bangnara in Patani: specimens from Upper Perak are intermediates.

Sciurus tenuis surdus Mill.
Sciurus tenuis surdus Miller, Proc. Wash. Acad. Sci. II, 1900, p. 80: Trang, Peninsular Siam.
Distr.—Malay Peninsula (part); Sumatra (part).

Sciurus tenuis gunong Rob. and Kl.
Sciurus tenuis gunong Robinson and Kloss, Journ. Fed. Malay States Mus. V, 1914, p. 119: Kao Nawng, Bandon, Peninsular Siam, 3,500 ft.
Distr.—Peninsular Siam (mountains).

Sciurus tenuis tahan Bonh.
Sciurus tahan Bonhote, Journ. Fed. Malay States Mus. III, 1908, p. 6: Mt. Tahan, Pahang, 5,300 ft.
Distr.—Malay States (mountains).

Sciurus tenuis sordidus Kl.
Sciurus tenuis sordidus Kloss, Ann. Mag. Nat. Hist. (8), VII, 1911, p. 119: Great Redang Island.
Distr.—Great Redang Island, off Trengganu, Malay States.

Sciurus tenuis tiomanicus (Rob.).
Tomeutes tenuis tiomanicus Robinson, Journ. Fed. Malay States Mus. VII, 1917, p. 103: Tioman Island.
Distr.—Tioman Island, off Pahang, Malay States.

Sciurus tenuis siantanicus Chas. and Kl.
Sciurus tenuis siantanicus Chasen and Kloss, Journ. Malay. Br. Roy. Asiat. Soc. 6, pt. 3, 1928, p. 33: Siantan Island.
Distr.—Islands of Jimaja, Mobur and Siantan, Anamba Islands.

Sciurus tenuis procerus Mill.
Sciurus procerus Miller, Proc. Wash Acad. Sci. III, 1901, p. 122: Bunguran Island.
Distr.—Bunguran Island, North Natuna Islands.

Sciurus tenuis parvus Mill.
Sciurus parvus Miller, Proc. Biol. Soc. Wash. XIV, 1901, p. 33: Sarawak.
Distr.—Borneo.

Sciurus tenuis modestus Müll.
Sciurus modestus S. Müller in Temminck, Verh. nat. ges. Ned. overz. bezitt., Zool. 1839, pp. 34 and 55: Mt. Singgalang, Padang Highlands, Sumatra.
Distr.—Sumatra. (part).

Sciurus tenuis altitudinis Rob. and Kl.
Sciurus tenuis altitudinis Robinson and Kloss, Journ. Stra. Br. Roy. Asiat. Soc. 73, 1916, p. 269: Korinchi Peak, Sumatra, 7,300 ft.
Distr.—Sumatra (part).

•**Sciurus tenuis mansalaris Mill.**
Sciurus mansalaris Miller, Proc. U.S. Nat. Mus. XXVI, 1903, p. 451: Mansalar Island.
Distr.—Mansalar Island, West Sumatra.

•**Sciurus tenuis bancarus Mill.**
Sciurus bancarus Miller, Proc. U.S. Nat. Mus. XXVI, 1903, p. 451: Bangkaru Island.
Distr.—Bangkaru Island, Banjak Islands, West Sumatra.

•**Sciurus tenuis batus Lyon.**
Sciurus mansalaris batus Lyon, Proc. U.S. Nat. Mus. LII, 1916, p. 443: Tana Bala Island.
Distr.—Tana Bala and Tana Masa Islands, Batu Islands, West Sumatra.

Sciurus jentinki. Jentink Squirrel.

Sciurus jentinki jentinki Thos.
Sciurus jentinki Thomas, Ann. Mag. Nat. Hist. (5), XX, 1887, p. 128: Mt. Kinabalu, North Borneo.
Distr.—Borneo (part).

Sciurus jentinki subsignanus Chas.
Sciurus jentinki subsignanus Chasen, Bull. Raffles Mus. 13, 1937, p. 80: Telen River, Dutch East Borneo, above 1172 metres.
Distr.—Borneo (part).

Sciurus brookei Thos. Brooke Squirrel.
Sciurus brookei Thomas, Ann. Mag. Nat. Hist. (6), IX, 1892, p. 253: Mt. Dulit, Sarawak.
Distr.—Borneo.

Sciurus lowii. Low Squirrel.

Sciurus lowii lowii Thos.
Sciurus lowii Thomas, Ann. Mag. Nat. Hist. (6) IX, 1892, p. 253: Lumbidan, Sarawak.
Distr.—Borneo.

Sciurus lowii bangueyæ Thos.
Sciurus lowi bangueyae Thomas, Ann. Mag. Nat. Hist. (8), V, 1910, p. 387: Banguey Island.
Distr.—Banguey Island, North Borneo.

Sciurus lowii robinsoni Bonh.
Sciurus robinsoni Bonhote, Fasciculi Malayenses, Zool., I, 1903, p. 24, pl. I: Bukit Besar, Patani, Peninsular Siam.
Sciurus robinsoni alacris Thos., Ann. Mag. Nat. Hist. (8), II, 1908, p. 306: Selangor-Pahang boundary, 3,000 ft.
Distr.—Malay Peninsula.

Sciurus lowii seimundi Thos. and Wrought.

Sciurus seimundi Thomas and Wroughton, Ann. Mag. Nat. Hist. (8), III, 1909, p. 440: Kundur Island.

Distr.—Kundur Island, Rhio Archipelago.

Sciurus lowii humilis Mill.

Sciurus humilis Miller, Smiths. Misc. Coll. LXI, 21, 1913, p. 24: Kateman River, East Sumatra.

Distr.—Sumatra (part).

Sciurus lowii vanakeni Rob. and Kl.

Sciurus vanakeni Robinson and Kloss, Journ. Strs. Br. Roy. Asiat. Soc. 73, 1916, p. 270: Barong Bharu, Korinchi, Sumatra, 4,000 ft.

Distr.—Sumatra (part).

* **Sciurus lowii piniensis** Mill.

Sciurus piniensis Miller, Smiths. Misc. Coll. XLV, 1903, p. 14: Pinie Island.

Distr.—Pinie Island, Batu Islands, West Sumatra.

* **Sciurus lowii balæ** Mill.

Sciurus balae Miller, Smiths. Misc. Coll. XLV, 1903, p. 4: Tana Bala Island.

Distr.—Tana Bala Island, Batu Islands, West Sumatra.

Sciurus lowii siberu Chas. and Kl.

Sciurus lowii siberu Chasen and Kloss, Proc. Zool. Soc. 1927, p. 824: Siberut Island.

Distr.—Siberut Island, Mentawi Islands, West Sumatra.

Sciurus lowii fraterculus Thos.

Sciurus fraterculus Thomas, Ann. Mus. Civ. Stor. Nat. Genova, XIV, 1895, p. 669: Sipora Island.

Distr.—Sipora Island, Mentawi Islands, West Sumatra.

* **Sciurus lowii pumilus** Mill.

Sciurus pumilus Miller, Smiths. Misc. Coll. XLV, 1913, p. 15: South Pagi Island.

Distr.—Pagi Islands, Mentawi Islands, West Sumatra.

Sciurus lowii natunensis Thos.

Sciurus lowi natunensis Thomas, Nov. Zool. II, 1895, p. 26: Sirhassen Island.

Sciurus lingungensis Mill., Proc. Wash. Acad. Sci. III, 1901, p. 123: Lingung Island, near Bunguran Island.

Distr.—Laut, Bunguran, and Lingung Islands, North Natuna Islands; Sirhassen Island, South Natuna Islands.

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Genus MENETES Thomas, 1908.

Menetes berdmorei.[1] Berdmore Squirrel.

[**Menetes berdmorei berdmorei** (Blyth).
Sciurus berdmorei Blyth, Journ. Asiatic Soc. Beng. XVIII, 1849, p. 603: Thoungyien District, Lower Burma.
Distr.—Extralimital.]

Menetes berdmorei peninsularis Rob. and Kl.
Menetes berdmorei peninsularis Robinson and Kloss, Journ. Nat. Hist. Soc. Siam, III, 1919, p. 375: Ban Kok Klap, Nakon Sritamarat, Peninsular Siam.
Distr.—Peninsular Siam, including the west coast islands of Junk Seylon and Panjang.

Genus LARISCUS Thomas and Wroughton, 1909.

Lariscus insignis.[2] Striped Ground Squirrel.

Lariscus insignis insignis (Cuv.).
Sciurus insignis F. Cuvier, in E. Geoffroy St. H. and F. Cuvier, Hist. Nat. Mamm. II, 1821, Lary, p. 2: Sumatra.
Distr.—Sumatra (lowlands).

Lariscus insignis niobe (Thos.).
Funambulus niobe Thomas, Ann. Mag. Nat. Hist. (7), II, 1898, p. 249: "Pajo" (? Pajokombo) Padang Highlands, West Sumatra.
Distr.—Sumatra (mountains).

* **Lariscus insignis rostratus** (Mill.).
Funambulus rostratus Miller, Smiths. Misc. Coll. XLV, 1903, p. 24: Tana Bala Island.
Distr.—Tana Bala Island, Batu Islands, West Sumatra.

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[1] *Menetes berdmorei.* Revisions: Thos., Journ. Bomb. Nat. Hist. Soc. XXIII, 1914, p. 23; Kloss, Journ. Nat. Hist. Soc. Siam, III, 1919, p. 372. Although I have fair series of this squirrel I am still not sure of even the main seasonal changes of pelage, but the number of forms recognized from Siam will probably have to be reduced. All the Malaysian skins are here referred to *peninsularis* which seems to be a good form, but it is possible that the skins from near the Isthmus of Kra, Ghirbi on the west coast, and those from the west coast islands are either *M. b. berdmorei*, or *amotus* (Domel Island, Mergui): the available skins are less intensely coloured than *peninsularis* from the east coast localities of Bandon and Nakon Sritamarat and the dorsal stripe is less well marked. But the differences may be seasonal.

[2] *Lariscus insignis.* In Sumatra *insignis* and *niobe* have been said to live side by side, but although they may sometimes be caught from the same camp, *niobe* is clearly only the high level subspecies of *insignis*: from no other one locality have two forms been reported as occurring together.

Lariscus insignis siberu Chas. and Kl.

Lariscus niobe siberu Chasen and Kloss, Proc. Zool. Soc. 1927, p. 827: Siberut Island.

Distr.—Siberut Island, Mentawi Islands, West Sumatra.

Lariscus insignis obscurus (Mill.).

Funambulus obscurus Miller, Smiths. Misc. Coll. XLV, 1903, p. 23: South Pagi Island.

Distr.—Pagi and Sipora Islands, Mentawi Islands, West Sumatra.

Lariscus insignis jalorensis (Bonh.).

Funambulus insignis jalorensis Bonhote, Fasc. Malay., Zool., I, 1903, p. 24: Jalor, Peninsular Siam.

Funambulus peninsulae Miller, Smiths. Misc. Coll. XLV, 1903, p. 25: Trang, Peninsular Siam.

Distr.—Malay Peninsula (part); Penang Island.

Lariscus insignis meridionalis Rob. and Kl.

Lariscus insignis meridionalis Robinson and Kloss, Journ. Fed. Malay States Mus. IV, 1911, p. 172: Singapore Island.

Distr.—Malay States (part).

Lariscus insignis fornicatus Rob.

Lariscus insignis fornicatus Robinson, Journ. Fed. Malay States Mus. VII, 1917, p. 102: Tioman Island.

Distr.—Tioman Island, off Pahang, east coast Malay Peninsula.

Lariscus insignis saturatus Chas.

Lariscus insignis saturatus Chasen, Bull. Raffles Mus. 9, 1934, p. 99: Bintang Island.

Distr.—Bintang Island, Rhio Archipelago.

Lariscus insignis castaneus (Mill.).

Funambulus castaneus Miller, Proc. Acad. Sci. Wash. II, 1900, p. 217: Siantan Island.

Distr.—Siantan Island, Anamba Islands.

Lariscus insignis diversus (Thos.).

Funambulus insignis diversus Thomas, Ann. Mag. Nat. Hist. (7), II, 1898, p. 248: Baram district, Sarawak.

Distr.—Borneo.

Lariscus insignis javanus (Thos. and Wrought.).

Laria insignis javana Thomas and Wroughton, Proc. Zool. Soc. (abstr.) 1909, p. 19; and Proc. p. 389: Buitenzorg, West Java.

Distr.—Java (part).

Lariscus insignis vulcanus Kl.

Lariscus niobe vulcanus Kloss, Journ. Fed. Malay States Mus. X, 1921, p. 233: Ongop Ongop, Idjen Massif, Besoeki, East Java, 5,700 ft.

Distr.—Java (part).

* **Lariscus insignis murianus Sody.**

Lariscus insignis murianus Sody, Temminckia, II, 1937, p. 219: Mt. Moeriah, Central Java, 800 metres.

Distr.—Java (part).

Lariscus hosei (Thos.).

Sciurus hosei Thomas, Ann. Mag. Nat. Hist. (6), X, 1892, pp. 215–216: Mt. Batu Song, Baram district, Sarawak.

Distr.—Borneo.

Genus DREMOMYS Heude, 1898.

Dremomys rufigenis.[1] Red-cheeked Squirrel.

Dremomys rufigenis rufigenis (Blanf.).

Sciurus rufigenis Blanford, Journ. Asiat. Soc. Bengal, XLVII, pt. 2, 1878, p. 156: Mt. Muleyit, Central Tenasserim.

Distr.—Peninsular Siam (part).

Dremomys rufigenis belfieldi (Bonh.).

Funambulus rufigenis belfieldi Bonhote, Journ. Fed. Malay States Mus. III, 1908, p. 9: Mt. Ulu Kali, Selangor, 4,800–5,800 ft.

Distr.—Malay Peninsula.

Dremomys everetti (Thos.). Everett Ground Squirrel.

Sciurus everetti Thomas, Ann. Mag. Nat. Hist. (6), VI, 1890, p. 171: Mt. Penrissen, West Sarawak.

Distr.—Borneo.

Genus RHINOSCIURUS J. E. Gray, 1843.

Rhinosciurus laticaudatus. Ground Squirrel.

Rhinosciurus laticaudatus laticaudatus (Müll.).

Sciurus laticaudatus S. Müller in Temminck, Verh. nat. ges. Ned. overz. bezitt., Zool. 1844, p. 100: Pontianak, West Borneo.

Distr.—Borneo; Sirhassen Island, South Natuna Islands; Bunguran Island, North Natuna Islands (identification of specimens from both Natuna localities uncertain).

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[1] *Dremomys rufigenis.* The race inhabiting the mountains of Nakon Sritamarat is *belfieldi*, but in the extreme north of Peninsular Siam another race occurs in which the back is much lighter, the feet redder, and the throat whiter. On description this northern race is referred to *rufigenis*, but no direct comparison of specimens has been possible.

Rhinosciurus laticaudatus tupaioides Blyth.
Rhinosciurus tupaioides Blyth, Journ. Asiat. Soc. Bengal, XXIV, 1855, p. 477: Malacca.
Rhinosciurus peracer Thos. and Wrought., Ann. Mag. Nat. Hist. (8), III, 1909, p. 440: Maxwell's Hill, Perak, 3,600 ft.
Distr.—Malay Peninsula; Siantan and Jimaja Islands, Anamba Islands.

Rhinosciurus laticaudatus leo Thos. and Wrought.
Rhinosciurus leo Thomas and Wroughton, Ann. Mag. Nat. Hist. (8), III, 1909, p. 440: Singapore Island.
Distr.—Singapore Island.

Rhinosciurus laticaudatus robinsoni Thos.
Rhinosciurus robinsoni Thomas, Journ. Fed. Malay States Mus. II, 1908, p. 104: Tioman Island.
Distr.—Tioman Island, off Pahang, east coast Malay Peninsula.

Rhinosciurus laticaudatus rhionis Thos.
Rhinosciurus leo rhionis Thomas and Wroughton, Ann. Mag. Nat. Hist. (8), III, 1909, p. 441: Karimon Island.
Distr.—Islands of Bintang, Batam, Kundur and Karimon, Rhio Archipelago; ? Lingga Island (? *subsp.*).

Rhinosciurus laticaudatus incultus Lyon.
Rhinosciurus incultus Lyon, Proc. U.S. Nat. Mus. LII, 1916, p. 444: Tuangku Island.
Distr.—Tuangku Island, Banjak Islands, West Sumatra.

Rhinosciurus laticaudatus saturatus Rob. and Kl.
Rhinosciurus laticaudatus saturatus Robinson and Kloss, Journ. Fed. Malay States Mus. VII, 1919, p. 274: Rimbo Pengadang, Barisan Range, West Sumatra, 3,200 ft.
Distr.—Sumatra.

Genus **TAMIOPS** Allen, 1906.

Tamiops mcclellandii. Zebra Squirrel.

[**Tamiops mcclellandii mcclellandii (Horsf.).**
Sciurus McClellandii Horsfield, Proc. Zool. Soc. 1839, p. 152: Assam.
Distr.—Extralimital.]

Tamiops mcclellandii novemlineatus (Mill.).
Sciurus novemlineatus Miller, Proc. Biol. Soc. Wash. XVI, 1903, p. 147: Trang, Peninsular Siam.
? *Tamias leucotis* Temm., Esq. Zool. 1853, p. 252.
Distr.—Malay Peninsula.

Genus **GLYPHOTES** Thomas, 1898.

Glyphotes simus Thos. Thomas Pigmy Squirrel.
Glyphotes simus Thomas, Ann. Mag. Nat. Hist. (6), II, 1898, p. 251: Mt. Kinabalu, North Borneo.
Distr.—Borneo.

Genus **RHEITHROSCIURUS** Gray, 1867.

Rheithrosciurus macrotis (Gray). Tufted Ground Squirrel.

Sciurus macrotis J. E. Gray, Proc. Zool. Soc. 1856, p. 341, pl. XLVI: Sarawak.
Distr.—Borneo.

Genus **NANNOSCIURUS** Trouessart, 1880.

Nannosciurus melanotis.[1] Black-eared Pigmy Squirrel.

Nannosciurus melanotis melanotis (Müll.).
Sciurus melanotis S. Müller in Temminck, Verh. nat. ges. Ned. overz. bezitt., Zool. (Mamm.), 1844, pp. 87 and 98: Java.
Sciurus soricinus Waterh., Cat. Mamm. Zool. Soc. 1838, p. 46: *nom. nud.?, non vid.*; And., Zool. Res. Exp. Yunnan, 1878, p. 265.
Distr.—Java.

Nannosciurus melanotis borneanus Lyon.
Nannosciurus borneanus Lyon, Proc. Biol. Soc. Wash. XIX, 1906, p. 54: Sanggau, West Borneo.
Distr.—Borneo (part).

Nannosciurus melanotis pallidus Chas. and Kl.
Nannosciurus melanotis pallidus Chasen and Kloss, Journ. Malay Br. Roy. Asiat. Soc. VI, 1928, p. 43: Long Poehoes, Middle East Borneo.
Distr.—Borneo (part).

Nannosciurus melanotis sumatranus Lyon.
Nannosciurus sumatranus Lyon, Proc. Biol. Soc. Wash. XIX, 1906, p. 53: Tarussan Bay, West Sumatra.
Distr.—Sumatra.

Nannosciurus melanotis bancanus Lyon.
Nannosciurus bancanus Lyon, Proc. Biol. Soc. Wash. XIX, 1906, p. 55: Banka Island.
Distr.—Banka Island.

Nannosciurus melanotis pulcher Mill.
Nannosciurus pulcher Miller, Proc. Acad. Nat. Sci. Philad. 1902, p. 153: Singkep Island.
Distr.—Singkep Island, Lingga Archipelago.

Nannosciurus whiteheadi (Thos.). Whitehead Pigmy Squirrel.

Sciurus whiteheadi Thomas, Ann. Mag. Nat. Hist. (5), XX, 1887, p. 127: Mt. Kinabalu, North Borneo, 3,000 ft.
Distr.—Borneo.

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[1] *Nannosciurus melanotis.* Revision: Lyon, Proc. Biol. Soc. Wash. XIX, 1906, p. 51.

Nannosciurus exilis. Pigmy Squirrel.

Nannosciurus exilis exilis (Müll.).

Sciurus exilis S. Müller, Tijdschr. Nat. geschied. physiol. V, 1838, p. 148: Batang Singalang, Sumatra, error, *subst.* Kapuas River basin, West Borneo *(Chas. and Kl. 1928).*

Distr.—Borneo (part).

Nannosciurus exilis sordidus Chas. and Kl.

Nannosciurus exilis sordidus Chasen and Kloss, Journ. Malay Br. Roy. Asiat. Soc. VI, 1928, p. 44: Long Temelan, Middle East Borneo.

Distr.—Borneo (part).

Nannosciurus exilis retectus Thos.

Nannosciurus exilis retectus Thomas, Ann. Mag. Nat. Hist. (8), V, 1910, p. 387: Banguey Island.

Distr.—Banguey Island.

Family SPALACIDÆ.

Genus **RHIZOMYS** J. E. Gray, 1831.

Rhizomys pruinosus. Hoary Bamboo Rat.

[**Rhizomys pruinosus pruinosus Blyth.**

Rhizomys pruinosus E. Blyth, Journ. Asiat. Soc. Bengal, XX, 1852, p. 519: Khasia Hills.

Distr.—Extralimital.]

Rhizomys pruinosus umbriceps Thos.

Rhizomys umbriceps Thomas, Ann. Mag. Nat. Hist. (8), XVIII, 1916, p. 445: Bukit Gantang, Larut, Perak.

Distr.—Malay States.

Rhizomys sumatrensis.[1] Bamboo Rat.

Rhizomys sumatrensis sumatrensis (Raffles).

Mus sumatrensis Raffles, Trans. Linn. Soc. XIII, 1821, p. 258: Malacca.

Spalax javanus Cuv., Règne Anim. ed. 2, I, 1829, p. 211; Iles de la Sonde = Malacca.

Nyctocleptes dekan Temm., Bijdr. Natuur. Wet. VII, 1832, p. 7, pl.: Malacca.

Distr.—Malay States.

Rhizomys sumatrensis cinereus M'Clell.

Rhizomys cinereus J. M'Clelland, Calcutta Journ. Nat. Hist. II, (7), 1841, p. 456: Tenasserim.

Distr.—Peninsular Siam.

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[1] *Rhizomys sumatrensis.* Revisions: Thos., Ann. Mag. Nat. Hist. (8), XVI, 1915, p. 56; Brongersma, Zool. Meded. (Leiden), XIX, 1936, p. 137. The genus *Nyctocleptes* Temm. is available for *sumatrensis* if reduction of *Rhizomys* is required. *R. s. cinereus* has been recorded from the Malay States, but I have never seen an adult from Taiping in Perak, or south of this place, that is not clearly referable to *sumatrensis.*

Rhizomys sumatrensis insularis (Thos.).

Nyctocleptes insularis Thomas, Ann. Mag. Nat. Hist. (8), XVI, 1915, p. 58: Padang Brahrang, Deli, Sumatra.
Distr.—Sumatra (part).

Rhizomys sumatrensis padangensis Brongs.

Rhizomys sumatrensis padangensis L. D. Brongersma, Zoologische Mededeelingen (Leiden), XIX, 1936, p. 154: Koto Gadang (Singgalung), West Sumatra.
Distr.—Sumatra (part).

Family MURIDÆ[1].

Genus **RATTUS** Fischer, 1803.

Rattus rattus.[2] Common Rat.

[**Rattus rattus rattus (Linn.).** Black Rat.

Mus rattus Linn., Syst. Nat. ed. 10, I, 1758, p. 61: Sweden.
Distr.—Extralimital.]

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[1] *Muridae.* Review: Tate, Bull. Amer. Mus. Nat. Hist. LXXII, 1936, pp. 501–728. In Zool. Meded. XIII, 1930, p. 100 Sody has reviewed the Javan forms.

[2] *Rattus rattus.* Rats that can be fairly allocated to *R. r. rattus*, *R. r. frugivorus* and *R. r. alexandrinus*, and others that are nondescript, occur near the wharves in the port of Singapore, and they certainly infiltrate along the shipping routes to other Malaysian ports for I have seen examples of the first named form (or a nondescript very near to it) from as far afield as Cocos and Christmas Islands, and from a boat trading to these places. But these introduced forms are rare on shore in Singapore, and from the evidence at my disposal they may be even rarer, or non-existent in some other Malaysian ports. For instance, Kopstein (1931), who knew their characters well, recorded their absence from large numbers of house rats examined in the harbour towns of Java. In Singapore, foreign rats seem to have great difficulty in perpetuating their race although occasional long tails among the resident population of *diardi* no doubt indicate the immigrant blood. A white bellied rat near *frugivorus* is established in Christmas and Cocos Islands.

I reviewed the forms of *R. rattus* occurring on the mainland of the Malay Peninsula in some detail in Bull. Raff. Mus. 8, 1933, p. 5. Here also (p. 22) reasons for the departure from a simple trinomial nomenclature are given. The races from the west coast islands of Peninsular Siam are reviewed in Bull. Raff. Mus. 13, 1937, p. 81; and those from the Malacca Straits and its coasts in Bull. Raff. Mus. 5, 1931, p. 77.

R. r. diardi is so variable that any attempt to recognize its local "strains" by a nomenclature is futile. The wild Javan race *roquei* is not accepted by Dammerman as distinct from *jalorensis:* it certainly is a very poorly marked race. In the north of the Peninsula, *jalorensis* merges into *tikos* (Tenasserim Town); in South Johore it is approaching *rhionis* in appearance. For the present I accept Dammerman's dictum that the type of *neglectus* is a house-rat.

Rattus rattus *form* **diardii (Jent.).** Malaysian House Rat.

Mus diardii Jentink, Notes Leyd. Mus. II, 1880, p. 13: West Java.

Mus neglectus Jentink, Notes Leyd. Mus. II, 1880, p. 14: Banjermasin, South Borneo.

Mus griseiventer Bonhote, Fasc. Malay., Zool. I, 1903, p. 30: Perak, Malay States.

Rattus rattus samati Sody, Natuurhist. Maandbl. (Maastricht), XXI, 1932, p. 159: Bali.

Rattus rattus palembang Tate and Arch., Amer. Mus. Novit. 802, 1935, pp. 1–2: Palembang, Sumatra.

Distr.—Malay Peninsula and the coastal islands; Anamba Islands; North and South Natuna Islands; most islands of the Rhio-Lingga Archipelagos; Banka; Sumatra; Mentawi Islands; Borneo and the coastal islands; Java; Bali; Christmas and Cocos Islands.

Rattus rattus *form* **argentiventer (Rob. and Kl.).** Ricefield Rat; Sawah Rat.

Epimys rattus argentiventer Robinson and Kloss, Journ. Strs. Br. Roy. Asiat. Soc. No. 73, 1916, p. 274; Pasir Ganting, west coast of Sumatra.

Rattus rattus brevicaudatus Horst. and De Raadt, Zool. Mededeel. (Leiden), IV, 1918, p. 69: Java.

Rattus rattus bali Kloss, Treubia, II, 1921, p. 123: Bali.

Distr.—Malay Peninsula; Sumatra; Borneo; Java; Bali.

Rattus rattus jalorensis (Bonh.). Malaysian Field Rat.

Mus jalorensis Bonhote, Fasciculi Malayenses, Zool., pt. I, 1903, p. 28: Nong Chik, Patani, Peninsular Siam.

Distr.—Malay Peninsula (part); Junk Seylon; Penang Island; Sumatra (part); Borneo (part), islands of Junata and Bauwal, South-West Borneo.

Rattus rattus turbidus (Mill.).

Epimys rattus turbidus Miller, Smiths. Misc. Coll. LXI, 21, 1913, p. 12: Tanggarong, south bank Mahakam River, South-East Borneo.

Distr.—Borneo (part).

Rattus rattus banguei Chas. and Kl.

Rattus rattus banguei Chasen and Kloss, Bull. Raff. Mus. 6, 1931, p. 35: Banguey Island.

Distr.—Islands of Banguey and Mallewallé, North Borneo.

Rattus rattus roquei Sody.

Rattus rattus roquei Sody, Natuur. Tijdschr. Ned. Ind. LXXXIX, 1929, p. 163: Semarang, Central Java.

Distr.—Java.

Rattus rattus tikos Hint.

Rattus rattus tikos Hinton, Journ. Bomb. Nat. Hist. Soc. XXVI, 1919, p. 400: Tenasserim Town.

Distr.—Peninsular Siam (part), including islands of Koh Rah and Koh Pra Tung, Takuapah.

Rattus rattus dentatus (Mill.).

Epimys rattus dentatus Miller, Smiths Misc. Coll. LXI, 21, 1913, p. 14: Hastings Island, Mergui Archipelago.

Distr.—Delisle Island, west coast Peninsular Siam (without direct comparison of topotypes).

Rattus rattus fortunatus (Mill.).

Epimys rattus fortunatus Miller, Smiths. Misc. Coll. LXI, 21, 1913, p. 15: Chance Island, Mergui Archipelago.

Distr.—Koh (Island) Yam Yai (Sugar loaves), west coast Peninsular Siam (without direct comparison of topotypes).

Rattus rattus panjius Chas.

Rattus rattus panjius Chasen, Bull. Raff, Mus. 13, 1937, p. 85: North Panjang Island.

Distr.—Islands of Panjang, Panjang North, and Koh Boi Yai, near Junk Seylon, west coast Peninsular Siam.

Rattus rattus alangensis Chas.

Rattus rattus alangensis Chasen, Bull. Raff. Mus. 13, 1937, p. 87: Alang Yai Island.

Distr.—Koh (Island) Alang Yai, near Junk Seylon, west coast Peninsular Siam.

Rattus rattus lontaris Chas.

Rattus rattus lontaris Chasen, Bull. Raff. Mus. 13, 1937, p. 88: Lontar Island.

Distr.—Lontar Island, west coast Peninsular Siam.

Rattus rattus kadanus Chas.

Rattus rattus kadanus Chasen, Bull. Raff. Mus. 13, 1937, p. 89: Kadan Island.

Distr.—Islands of Muntia (Koh Muk), and Kadan (Papan), west coast Peninsular Siam.

Rattus rattus moheius Chas.

Rattus rattus moheius Chasen, Bull. Raff. Mus. 13, 1937, p. 91: Mohea Island.

Distr.—Mohea Islands (north and south), west coast Peninsular Siam.

Rattus rattus pipidonis Chas.

Rattus rattus pipidonis Chasen, Bull, Raff. Mus. 13, 1937, p. 92: Pipidon Island.

Distr.—Koh (Island) Pipidon, west coast Peninsular Siam.

Rattus rattvs pannosus (Mill.).

Mus pannosus Miller, Proc. Biol. Soc. Wash. XIII, 1900, p. 190: Adang Island.

Distr.—Adang Island, Butang Islands, Straits of Malacca.

*** Rattus rattus pannellus (Mill.).**
Epimys pannellus Miller, Smiths. Misc. Coll. LXI, 21, 1913, p. 8: Rawi Island.
Distr.—Rawi Island, Butang Islands, Straits of Malacca.

Rattus rattus viclana (Mill.).
Epimys rattus viclana Miller, Smiths. Misc. Coll. LXI, 21, 1913, p. 13: Langkawi Island.
Distr.—Islands of Langkawi, Dayang Bunting and Terutau, Straits of Malacca; Telibon Island, west coast Peninsular Siam.

Rattus rattus payanus Chas. and Kl.
Rattus rattus payanus Chasen and Kloss, Bull. Raff. Mus. 5, 1931, p. 79: Paya Island.
Distr.—Paya Island, Straits of Malacca.

Rattus rattus rumpia (Rob. and Kl.).
Mus rattus rumpia Robinson and Kloss, Journ. Fed. Malay States Mus. IV, 1911, p. 169: Rumbia Island.
Distr.—Rumbia Island, Sembilan Islands, Straits of Malacca.

Rattus rattus jarak (Bonh.).
Mus jarak Bonhote, Journ. Fed. Malay States Mus. 1905, p. 69: Jarak Island.
Distr.—Jarak Island, Straits of Malacca.

Rattus rattus jemuris Chas. and Kl.
Rattus rattus jemuris Chasen and Kloss, Bull. Raffles Mus. 5, 1931, p. 78: Jemur Island.
Distr.—Jemur Island, Aroa Islands, Straits of Malacca.

Rattus rattus robinsoni Chas.[1]
Rattus rattus robinsoni Chasen, Bull. Raffles Mus. 15, 1940, p. 154: Koh Samui.
Distr.—Islands of Samui and Pennan, North-East Malay Peninsula.

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[1] **Rattus rattus robinsoni** subsp. nov.

A smooth coated, dull coloured rat very near to *R. r. jalorensis* (approaching *tikos*) of the opposite mainland, but averaging rather larger and at once separable, even individually, by the longer tooth row, larger teeth, and extremely large bullæ. The large series on which this form is founded is recorded in detail by Robinson and Kloss in Journ. Fed. Malay States Mus. V, 1915, p. 139.

Type.—Adult male, skin and skull, collected on Koh (Island) Samui, off Peninsular Siam, North-East Malay Peninsula, on 8th May, 1913, by H. C. Robinson and E. Seimund. Selangor Mus. No. 379/13.

The measurements have already been recorded (*loc cit. sup.* p. 138).

Rattus rattus perhentianus Chas.[1]

Rattus rattus perhentianus Chasen, Bull. Raffles Mus. 15, 1940, p. 155: East Perhentian Island.

Distr.—Islands of East Perhentian and Great Redang, off Trengganu, east coast Malay Peninsula.

Rattus rattus tiomanicus (Mill.).

Mus tiomanicus Miller, Proc. Wash. Acad. Sci. II, 1900, p. 209: Tioman Island.

Distr.—Tioman Island, off Pahang, east coast Malay Peninsula.

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[1] **Rattus rattus perhentianus** subsp. nov.

Compared with *jalorensis* of the mainland, *perhentianus* is slightly larger, and more robustly built in body and skull: the pelage is coarser, and in fresh pelage the upper parts are slightly darker. Grey bases to the hair on the sides of the body tend to obscure the line of demarcation in some specimens. The tooth row averages longer, and the teeth are usually larger. The anterior palatal foramina are more open: this character at once meets the eye when the two series of skulls are compared. The general divergence from the mainland form is in the same direction as that taken by *tinggius* and the two forms are so much alike that, at first, great difficulty was experienced in attempting a separation. A decisive character was then found in the nasals. In *perhentianus* these are gently curved and continue, evenly, the convex profile of the skull: in *tinggius* they are flattened posteriorly, or even slightly concave in about the middle of their length. This marked difference supported by 42 skulls (17 and 25), is one of the most interesting and striking subspecific distinctions I have observed in this difficult genus. It was certainly an unexpected discovery in the comparison of two series of specimens, so much alike in all other characters, and from localities so close, geographically.

Type.—Adult male, skin and skull, collected on East Perhentian Island, off the Trengganu coast, east coast Malay Peninsula, on 13th September, 1910, by C. Boden Kloss. Raffles Mus. No. 2255/10.

Measurements.—Head and body, 182; tail, 208; hind-foot, s. u. 36; ear, 22 mm.

Skull.—Greatest length, 44·2; condylo-basilar length, 38·5; palatilar length, 21·4; length of anterior palatal foramina, 7·9; zygomatic width, 20·5; median nasal length, 6·5; upper molar row, alveoli 7·2 mm.

MURIDÆ

Rattus rattus pemanggis Chas.[1]

Rattus rattus pemanggis Chasen, Bull. Raffles Mus. 15, 1940, p. 156: Pemanggil Island.

Distr.—Pemanggil Island, off Johore, east coast Malay Peninsula.

Rattus rattus tingius (Mill.).[2]

Epimys tingius Miller, Smiths. Misc. Coll. LXI, 21, 1913, p. 9: Tinggi Island.

Distr.—Tinggi Island, off Johore, east coast Malay Peninsula.

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[1] **Rattus rattus pemanggis subsp. nov.**

Nearer to the dark *R. r. tiomanicus* than to its other neighbours, the normally white-bellied, paler backed races of Tinggi and Aor Islands. Compared with *tiomanicus,* in fresh pelage the upper parts are rather darker, especially on the sides of the body which are of a deeper, duller and less ochraceous brown. The upper parts are also more uniformly coloured, and with a finer grizzle: in *tiomanicus* there is a tendency to a blackened zone along the spine. On the series the under parts are whiter and less grey, and among the adults there is no example like the deeply grey-bellied specimens common in *tiomanicus;* other specimens are purely white below, which condition is not seen in the allied race. The line of demarcation along the flanks is much more decisive. The average size is rather larger, the tail running up to 215 mm. in length, and the skull to 45·7 mm. in its greatest length.

Type.—Adult male, skin and skull, collected on Pemanggil Island, South China Sea on 16th June, 1912, by H. C. Robinson and E. Seimund, Raffles Mus. No. 427/12.

Measurements.—Head and body, 186; tail, 210; hind-foot, s. u. 34; ear, 22 mm.

Skull.—Greatest length, 44; condylo-basilar length, 37·8; palatilar length, 21; length anterior palatal foramina, 7·5; upper molar row, aveoli, 7·5; zygomatic width, 20·2; median nasal length, 15·4 mm.

Remarks.—Rats on the small islands of the South China Sea are exposed to bad weather at certain seasons, and their pelage quickly wears and bleaches. Some show the effects of bleaching to an extraordinary degree, even in quite young individuals. Eighteen specimens of *pemanggis* have been compared with long series of the allied forms.

[2] *Rattus rattus tinggius.* Rats also occur on other small islands in the Johore Archipelago, some nearer to the mainland than Pulau Tinggi, others at about the same distance from the coast. None of the series could be placed under *jalorensis* without comment, (*e.g.* they all run a trifle large), and yet on no island is the differentiation equal to that on Tinggi, *e.g.* the pelage is not so harsh, and the teeth are rather smaller. I therefore suggest that rats from the islands of Kaban, Sri Buat, Babi and Sibu be regarded as *R. r. jalorensis>tinggius:* those from Sibu are nearest to *tinggius* and those from Kaban nearest to *jalorensis.*

Rattus rattus roa (Mill.).
Epimys roa Miller, Smiths. Misc. Coll. LXI, 21, 1913, p. 10: Aor Island.
Distr.—Islands of Aor and Dayang, off Johore, east coast Malay Peninsula.

Rattus rattus batin Rob.
Rattus rattus batin Robinson, Journ. Fed. Malay States Mus. VII, 1916, p. 66: Mapor Island.
Distr.—Mapor (or Panjang) Island, Rhio Archipelago.

Rattus rattus kunduris Chas. and Kl.
Rattus rattus kunduris Chasen and Kloss, Bull. Raffles Mus. 5, 1931, p. 77: Kundur Island.
Distr.—Islands of Little Karimon, Karimon, Merah, Kundur, Tulang (possibly also Sugi and Durian), Rhio Archipelago.

Rattus rattus rhionis (Thos. and Wrought.).
Mus rattus rhionis Thomas and Wroughton, Ann. Mag. Nat. Hist. (8), III, 1909, p. 441: Bintang Island.
Distr.—Sumatra (part); islands of Bintang, Battam, Bulan and Galang, Rhio Archipelago.

Rattus rattus siantanicus (Mill.).
Mus siantanicus Miller, Proc. Wash. Acad. Sci. II, 1900, p. 210: Siantan Island.
Distr.—Islands of Siantan and Jimaja, Anamba Islands.

Rattus rattus luxuriosus Chas.
Rattus rattus luxuriosus Chasen, Bull. Raffles Mus. 10, 1935, p. 20: Bunguran Island.
Distr.—Islands of Sedanau and Bunguran, North Natuna Islands (? also Lingung and Midai, *subsp. incert.*).

Rattus rattus pauper (Mill.).
Epimys rattus pauper Miller, Smiths. Misc. Coll. LXI, 21, 1913, p. 13: Sirhassen Island.
Distr.—Islands of Sirhassen, Panjang and Subi, South Natuna Islands.

Rattus rattus mangalumis Kl.
Rattus rattus mangalumis Kloss, Bull. Raffles Mus. 5, 1931, p. 88: Mangalum Island.
Distr.—Mangalum Island, North-West Borneo.

Rattus rattus tambelanicus (Mill.).
Mus tambelanicus Miller, Proc. Wash. Acad. Sci. II, 1900, p. 212: Great Tambelan Island.
Distr.—Islands of Great Tambelan, Bunoa, Wai and Gilla, Tambelan Islands, South China Sea.

Rattus rattus julianus (Mill.).
Mus julianus Miller, Smiths. Misc. Coll. XLV, 1903, p. 34: St. Julian Island.
Distr.—St. Julian Island, Tambelan Islands, South China Sea.

Rattus rattus lamucotanus (Lyon).
Epimys neglectus lamucotanus Lyon, Proc. U. S. Nat. Mus. XL, 1911, p. 100: Lamukotan Island.
Distr.—Islands of Lamukotan, Panebangan and Mata Siri, South-East Borneo.

Rattus rattus ducis (Lyon).
Epimys neglectus ducis Lyon, Proc. U. S. Nat. Mus. XL, 1911, p. 99: Datu Island.
Distr.—Islands of Pelapis and Datu, West Borneo.

Rattus rattus tua (Mill.).
Epimys tua Miller, Smiths. Misc. Coll. LXI, 21, 1913, p. 10: Maratua Island.
Distr.—Maratua Island, South-East Borneo.

Rattus rattus simalurensis (Mill.).
Mus simalurensis Miller, Proc. U.S. Nat. Mus. XXVI, 1903, p. 458: Simalur Island.
Distr.—Islands of Simalur and Siumat, West Sumatra.

Rattus rattus babi Lyon.
Rattus simalurensis babi Lyon, Proc. U.S. Nat. Mus. LII, 1916, p. 447: Babi Island.
Distr.—Babi Island, West Sumatra.

Rattus rattus lasiæ Lyon.
Rattus simalurensis lasiae Lyon, Proc. U.S. Nat. Mus. LII, 1916, p. 446: Lasia Island.
Distr.—Lasia Island, West Sumatra.

Rattus rattus mærens (Mill.).
Epimys maerens Miller, Proc. Biol. Soc. Wash. XXIV, 1911, p. 26: Nias Island.
Distr.—Nias Island, West Sumatra.

Rattus rattus mentawi Chas. and Kl.
Rattus rattus mentawi Chasen and Kloss, Proc. Zool. Soc. 1927, p. 831: Sipora Island.
Distr.—Sipora and Siberut Islands, Mentawi Islands, West Sumatra.

Rattus rattus lugens (Mill.).
Mus lugens Miller, Smiths. Misc. Coll. XLV, 1903, p. 33: North Pagi Island.
Distr.—Pagi Islands, West Sumatra.

Rattus baluensis.[1] Summit Rat.

Rattus baluensis baluensis (Thos.).
Mus baluensis Thomas, Ann. Mag. Nat. Hist. (6), XIV, 1894, p. 454: Mt. Kinabalu, North Borneo, 8,000 ft.
Distr.—Borneo.

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[1] *Rattus baluensis.* Almost certainly only a high level form of *R. rattus.*

Rattus baluensis korinchi (Rob. and Kl.).

Epimys korinchi Robinson and Kloss, Journ. Strs. Br. Roy. Asiat. Soc. 73, 1916, p. 275: Korinchi Peak, West Sumatra, 7,300 ft.

Distr.—Sumatra.

Rattus hoogerwerfi Chas.

Rattus hoogerwerfi Chasen, Treubia, XVII, 1939, p. 207: Blang Kedjeren, Atjeh, North Sumatra, 800 m.

Distr.—Sumatra.

Rattus concolor.[1] Little Burmese Rat.

Rattus concolor concolor (Blyth).

Mus concolor Blyth, Journ. Asiat. Soc.. Beng. XXVIII, 1859, p. 295: Shwegyin, Burma.

Mus obscurus Miller, Proc. Wash. Acad. Sci. II, 1900, p. 213: Tioman Island (*nom. praeocc.*).

Mus pullus Miller, Proc. Biol. Soc. Wash. XIV, 1901, p. 178: *nom. nov.* for *M. obscurus.*

Mus clabatus Lyon, Proc. U.S. Nat. Mus. XXXI, 1906, p. 596: Banka Island.

Distr.—Malay Peninsula and coastal islands of Langkawi, Penang and Singapore. Islands of Tioman and Aor, east coast Malay Peninsula; islands of Bintang, Batam, Galang, Bulan, Karimon and Sauh, Rhio Archipelago; Banka; islands of Siantan and Jimaja, Anamba Islands; Bunguran, North Natuna Islands; islands of Sirhassen and Panjang, South Natuna Islands.

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[1] *Rattus concolor.* I cannot see any difference between specimens from South Tenasserim, many parts of Siam, and the Malay Peninsula and therefore regard them all as *R. c. concolor*, but no exact topotypes of this form have been examined: *ephippium* is a poor race and although most specimens can be separated on the wider palate (if skulls of equal size are compared), some cannot, and I cannot appreciate any other distinction. Series from some of the smaller islands are hard to place. In Java the average size of *ephippium* is very slightly larger than in Sumatra and Borneo.

Excluding the two very distinct mountain races, in Malaysia this rat is usually found in, or not far from human settlements. In the Malay Peninsula it is primarily a house rat and although specimens may be trapped in primary forest, such animals are rare, and I have never seen one from a remote, undisturbed collecting ground in old forest. In the Sunda Islands, *ephippium* does seem to be, in part, a field rat, but everywhere it again occurs far more commonly in the villages and houses. Specimens taken in forest are usually paler and brighter brown on the upper parts and lighter grey on the under parts than those trapped in houses etc. The port rats of the North Java coast are so dark that they justify the distinction of a special name (*otteni*); they are also characterised by certain small cranial distinctions. In other parts of Malaysia house rats, and those imported into many small islands by shipping, are often more like *otteni* than *concolor* or *ephippium*, and even in Singapore I have seen a few dark specimens with very narrow anterior palatal foramina that could reasonably be referred to *otteni.* The natural range of the species is now difficult, if not impossible to make out, but judging from

Rattus concolor ephippium (Jent.).

Mus ephippium Jentink, Notes Leyd. Mus. II, 1879, p. 15: Sumatra.

Rattus schuitemakeri Sody, Ann. Mag. Nat. Hist. (10), XII, 1933, p. 431: Pontianak, West Borneo.

Distr.—Sumatra (part); Nias Island; Borneo; Java (part); Bali.

Rattus concolor *form* otteni Kopst.

Rattus concolor otteni Kopstein, Geneeskundig Tijdschr. Ned. Ind. I, 1931: *See* also Kopst., Zeitschr. f. wissen. Biol. (Abt. A. Zeitschr. f. Morph. ökol. Tiere), XXII, 1931, p. 783: Cheribon, North Java.

Distr.—Ports of the north coast of Java: characters adumbrated in specimens from other ports throughout Malaysia.

Rattus concolor stragulum (Rob. and Kl.).

Epimys stragulum Robinson and Kloss, Journ. Strs. Br. Roy. Asiat Soc. No. 73, 1916, p. 274: Korinchi Peak, West Sumatra, 7,300 ft.

Distr.—Sumatra (part).

* **Rattus concolor surdus (Mill.).**

Mus surdus Miller, Proc. U. S. Nat. Mus. XXVI, 1903, p. 460: Simalur Island.

Distr.—Simalur Island, West Sumatra.

Rattus concolor equile Rob. and Kl.

Rattus concolor equile Robinson and Kloss, Journ. Fed. Mal. States Mus. XIII, 1927, p. 209: Ongop Ongop, Idjen Massif, East Java, 5,700 ft.

Distr.—Java (part).

Rattus annandalei.[1] Annandale Rat.

Rattus annandalei annandalei (Bonh.).

Mus annandalei Bonhote, Fasciculi Malayenses, Zool. pt. I, 1903, p. 30: Sungkai, South Perak.

Distr.—Malay States (part).

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the specimens I should say that it is likely that all those examined from the small islands in the South China Sea are importations. A series from the Natuna Islands is very dark and is perhaps better put with *concolor* than *ephippium* to which race I once referred it.

The peculiarity of the infraorbital plate in the type of *clabatus* described by Lyon can be seen in other races of *concolor*.

The type of *Rattus schuitemakeri* is, I think, a somewhat abnormal specimen of *concolor* (*sen. lat.*).

Erratum.—Bull. Raff. Mus. 10, 1935, p. 21: for *Rattus rattus ephippium* read *R. concolor ephippium*.

[1] *Rattus annandalei.* This rat is rare, or difficult to obtain, in the north of the Malay Peninsula, and I know of the type, a second specimen from Perak, and a specimen from Trang only. The type is subadult. The northern specimens have slightly smaller skulls than even younger animals from the south of the Malay States.

Rattus annandalei bullatus (Lyon).
Mus bullatus Lyon, Proc. U. S. Nat. Mus. XXXIV, 1908, p. 646: Rupat Island, East Sumatra.
Mus villosus Kloss, Journ. Fed. Mal. States Mus. II, 1908, p. 146: Singapore Island.
Distr.—Malay States (part); Sumatra; islands of Rupat and Padang, East Sumatra.

Rattus annandalei remotus (Rob. and Kl.).
Epimys remotus Robinson and Kloss, Ann. Mag. Nat. Hist. (8), XIII, 1914, p. 231: Island of Samui.
Distr.—Islands of Pennan and Samui, North-East Malay Peninsula.

Müller Rat.

Rattus mülleri.[1]

Rattus mülleri mülleri (Jent.).
Mus mülleri Jentink, Notes Leyd. Mus. II, 1880, p. 16: Batang Singalan, West Sumatra.
Distr.—Sumatra (part).

Rattus mülleri campus (Rob. and Kl.).
Epimys mülleri campus Robinson and Kloss, Journ. Strs. Br. Roy. Asiat. Soc. No. 73, 1916, p. 275: Pasir Ganting, West Sumatra.
Rattus virtus Lyon, Proc. Biol. Soc. Wash. XXIX, 1916, p. 210: Siak River, East Sumatra.
Distr.—Sumatra (part).

* **Rattus mülleri domitor (Mill.).**
Mus domitor Miller, Proc. U. S. Nat. Mus. XXVI, 1903, p. 461: Mansalar Island.
Distr.—Mansalar Island, Tapanuli Bay, West Sumatra.

* **Rattus mülleri potens (Mill.).**
Epimys potens Miller, Smiths. Misc. Coll. LXI, 21, 1913, p. 17: Tuangku Island.
Distr.—Tuangku Island, Banjak Islands, West Sumatra.

* **Rattus mülleri valens (Mill.).**
Epimys valens Miller, Smiths. Misc. Coll. LXI, 21, 1913, p. 18: Bangkaru Island.
Distr.—Bangkaru Island, Banjak Islands, West Sumatra.

* **Rattus mülleri balmasus Lyon.**
Rattus balmasus Lyon, Proc. U. S. Nat. Mus. LII, 1916, p. 447: Tana Bala Island.
Distr.—Islands of Tana Masa and Tana Bala, Batu Islands, West Sumatra.

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[1] *Rattus mülleri*. *R. m. campus*, presumed to be a coastal form, is only doubtfully distinct from *mülleri*. More specimens than are available at present would probably justify the separation of a Penang Island race from *validus*.

* **Rattus mülleri pinatus Lyon.**
Rattus pinatus Lyon, Proc. U.S. Nat. Mus. LII, 1916, p. 448: Pinie Islands.
Distr.—Pinie Island, Batu Islands, West Sumatra.

Rattus mülleri firmus (Mill.).
Mus firmus Miller, Proc. Acad. Nat. Sci. Philad. 1902, p. 155: Lingga Island.
Distr.—Islands of Batam, Moro Besar, Sugi, Durian, Karimon, Kundur, Setoko, Sauh, Sebang, Bakong and Lingga, Rhio-Lingga Archipelagos.

Rattus mülleri credulus Chas.[1]
Rattus mülleri credulus Chasen, Bull. Raff. Mus. 15, 1940, p. 162: Bunguran Island.
Distr.—Islands of Bunguran and Lingung, North Natuna Islands.

* **Rattus mülleri chombolis (Lyon).**
Mus chombolis Lyon, Proc. U. S. Nat. Mus. XXXVI, 1909, p. 484: Chombol Island.
Distr.—Chombol Island, Rhio Archipelago.

Rattus mülleri pollens (Mill.).
Epimys pollens Miller, Smiths. Misc. Coll. LXI, 21, 1913, p. 17: Banka Island.
Distr.—Banka Island.

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[1] **Rattus mülleri credulus** subsp. nov.

Intermediate in characters between *integer* of Sirhassen Island, and *firmus* of the Rhio-Lingga Archipelago: colour nearly as in *integer*, but tail and hindfoot longer,and about as in *firmus*.

Type.—Adult male, skin and skull, collected on Bunguran Island, North Natuna Islands on 7th September, 1928, by F. N. Chasen. Raffles Museum No. 661.

Measurements.—Head and body, 232; tail 270, hind foot, s.u. 49; ear, 24 mm. *Skull* (broken).—interorbital breadth, 7·8; upper molar row, alveoli, 10·2; mastoid width, 19; condyle to tip of interpterygoid space, 22 mm.

Remarks.—The upper parts are slightly less blackened than in *integer*, and the pale element in the pelage is rather warmer in tone: the flanks especially are brighter in colour. The under parts are as in *integer*, that is to say whiter than in *firmus*, the pale area narrower, and with a thin grey-brown mid-ventral line. A specimen recorded from Lingung Island is referred to *credulus* purely on zoogeographic grounds: it has not been examined.

Rattus mülleri validus (Mill.).

Mus validus Miller, Proc. Biol. Soc. Wash. XIII, 1900, p. 141: Trang, Peninsular Siam.

Mus mülleri foederis Rob. and Kloss, Journ. Fed. Mal. States Mus. IV, 1911, p. 245: Ulu Temengoh, Upper Perak, Malay States.

Rattus victor Miller, Smiths. Misc. Coll. LXI, 21, 1913, p. 16: near mouth of Rompin River, East Pahang.

Distr.—Malay Peninsula; Penang Island.

Rattus mülleri terempa Chas. and Kl.

Rattus validus terempa Chasen and Kloss, Journ. Mal. Br. Roy. Asiat. Soc. VI, pt. 3, 1928, p. 36: Siantan Island.

Distr.—Islands of Siantan and Jimaja, Anamba Islands.

Rattus mülleri borneanus (Mill.).

Epimys borneanus Miller, Smiths. Misc. Coll. LXI, 21, p. 15: Telok Karang Tiga, South-East Borneo.

Distr.—Borneo.

Rattus mülleri otiosus Chas.

Rattus mülleri otiosus Chasen, Bull. Raffles Mus., 9, 1934, p. 98: Balambangan Island.

Distr.—Islands of Balambangan and Banguey, North Borneo.

* **Rattus mülleri crassus** (Lyon).

Epimys crassus Lyon, Proc. U. S. Nat. Mus. XL, 1911, p. 103: Lamukotan Island.

Distr.—Lamukotan Island, West Borneo.

* **Rattus mülleri sebucus** (Lyon).

Epimys sebucus Lyon, Proc. U. S. Nat. Mus. XL, 1911, p. 103: Sebuko Island.

Distr.—Sebuko Island, South-East Borneo.

Rattus mülleri integer (Mill.).

Mus integer Miller, Proc. Wash. Acad. Sci. III, 1901, p. 119: Sirhassen Island.

Distr.—Sirhassen Island, South Natuna Islands.

* **Rattus mara** (Mill.).[1]

Epimys mara Miller, Smiths. Misc. Coll. LXI, 21, 1913, p. 10: Maratua Island.

Distr.—Maratua Island, South-East Borneo.

Rattus infraluteus.[2] Giant Rat.

Rattus infraluteus infraluteus (Thos.).

Mus infraluteus Thomas, Ann. Mag. Nat. Hist. (6), II, 1888, p. 409: Mt. Kinabalu.

Distr.—Borneo.

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[1] *Rattus mara.* I have not examined an example of this species. According to Miller it occurs together on Maratua with a form compared with *neglectus.* It may therefore be a race of *mülleri,* but the very small teeth seem to preclude this.

[2] *Rattus infraluteus.* The high level representative of *mülleri.*

Rattus infraluteus maxi Sody.

Rattus maxi Sody, Natuurhistorisch Maandblad (Maastricht), Jrg. 21, 1932, p. 157: Tjiboeni, Bandoeng, West Java, 1,350 m.

Distr.—Sumatra; Java.

*** Rattus enganus (Mill.).**[1] Engano Rat.

Mus enganus Miller, U. S. Nat. Mus. XXX, 1906, p. 821: Engano Island.

Distr.—Engano Island, West Sumatra.

Rattus macleari (Thos.)[2] Maclear Rat.

Mus macleari Thomas, Proc. Zool. Soc. 1887, p. 513: Christmas Island.

Distr.—Christmas Island, Indian Ocean.

Rattus sabanus. Large Spiny-backed Rat.

Rattus sabanus sabanus (Thos.).

Mus sabanus Thomas, Ann. Mag. Nat. Hist. (5), XX, 1887, p. 269: Mt. Kinabalu, North Borneo.

Distr.—Borneo.

Rattus sabanus nasutus (Lyon).

Epimys nasutus Lyon, Proc. U. S. Nat. Mus. XL, 1911, p. 104: Panebangan Island.

Distr.—Panebangan Island, West Borneo.

Rattus sabanus luta (Mill.).

Epimys luta Miller, Smiths. Misc. Coll. LXI, 21, 1913, p. 18: Laut Island.

Distr.—Laut Island, South-East Borneo.

Rattus sabanus vociferans (Mill.).

Mus vociferans Miller, Proc. Biol. Soc. Wash. XIII, 1900, p. 138: Trang, Peninsular Siam.

Distr.—Malay Peninsula: Sumatra (part).

Rattus sabanus ululans (Rob. and Kl.).

Epimys ululans Robinson and Kloss, Journ. Strs. Br. Roy. Asiat. Soc. No. 73 July, 1916, p. 272: Siolak Daras, Korinchi valley, South-West Sumatra.

Distr.—Sumatra (part).

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[1] *Rattus enganus.* Known only from the type which I have never examined. Perhaps a much altered form of *mülleri.*

[2] *Rattus macleari.* Nearest to *mülleri* among Malaysian rats.

Rattus sabanus tapanulius Lyon.

Rattus vociferans tapanulius Lyon, Proc. Biol. Soc. Wash. XXIX, September, 1916, p. 209: Tapanuli Bay, North-West Sumatra.

Distr.—Sumatra (part).

Rattus sabanus tersus (Thos. and Wrought.).

Mus vociferans tersus Thomas and Wroughton, Ann. Mag. Nat. Hist. (8), IV, 1909, p. 535: Terutau Island.

Distr.—Terutau Island, Straits of Malacca.

Rattus sabanus lancavensis (Mill.).

Mus vociferans lancavensis Miller, Proc. Biol. Soc. Wash. XIII, 1900, p. 188: Langkawi Island.

Distr.—Langkawi Island, Straits of Malacca.

Rattus sabanus lucas (Mill.).

Mus lucas Miller, Smiths. Misc. Coll. XLV, 1903, p. 30: St. Luke Island, Mergui Archipelago.

Distr.—Delisle Island, west coast Peninsular Siam.

Rattus sabanus dictatorius Chas.[1]

Rattus sabanus dictatorious Chasen, Bull. Raffles Mus. 15, 1940, p. 165: Penang Island.

Distr.—Penang Island, Straits of Malacca.

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[1] **Rattus sabanus dictatorius** subsp. nov.

Very close to *R. s. vociferans* of the Malay Peninsula, but the tail shorter; the skull slightly smaller; and the upper parts averaging very slightly darker.

Type.—Adult male, skin and skull, collected on Penang Island, Straits of Malacca, 9th December, 1927, by F. N. Chasen, Raff. Mus. No. 346.

Measurements.—Head and body, 219; tail, 305; hind-foot, s.u., 45; ear, 26 mm. (in the flesh). *Skull.*—Greatest length, 53·5; condylo-basilar length, 44·4; palatilar length, 23·8; length of palatal foramina, 7·5; zygomatic width, 24·1; median nasal length, 21·5; upper molar row (alveoli), 9·8 mm.

Remarks.—Eight specimens from Penang have the tail dark almost to the tip on the upper surface, as in *vociferans.* The average length of the tail is 325 against 368·4 mm. in very much larger series of the mainland form. Average measurements of the skull in the two forms are.—greatest length, 54·3 against 56; zygomatic width, 24 against 25·4 mm. The colour difference is an average one, and the type of *dictatorius* is like many dark examples of *vociferans* on the upper surface. This new form is not a well marked race, but the very short tail precludes it being merged in *vociferans.*

Rattus sabanus salanga Chas.[1]

Rattus sabanus salanga Chasen, Bull. Raffles Mus. 15, 1940, p. 166: Island of Junk Seylon (Salanga).

Distr.—Islands of Junk Seylon, Panjang, Lontar and Telibon, west coast Peninsular Siam.

Rattus sabanus stridens (Mill.).

Mus stridens Miller, Smiths. Misc. Coll. XLV, 1903, p. 28: Tioman Island.

Distr.—Tioman Island, off Pahang, east coast Malay Peninsula.

Rattus sabanus fremens (Mill.).

Mus fremens Miller, Proc. Acad. Sci. Philad. 1902, p. 154: Singkep Island.

Distr.—Islands of Singkep and Lingga, Lingga Archipelago.

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[1] **Rattus sabanus salanga** subsp. nov.

Very near to *R. s. vociferans* of the adjacent mainland, but slightly smaller in body and skull. Distal half of the tail usually white as in many other small island races of *sabanus*.

Type.—Adult male, skin and skull, collected on Junk Seylon Island (also known as Salanga, Puket, etc.), on 18th December, 1917, by an Asiatic collector. Raffles Museum No. 6420.

Remarks.—This large rat is common on the inshore islands near the west coast of Peninsular Siam, but the local form is not so well differentiated as on the neighbouring islands of Terutau and Langkawi. A large series of *vociferans* from the mainland of the Malay Peninsula gives the following average measurements which can be compared with the measurements in brackets representing, firstly, the average of twenty adults of *salanga* from the various islands mentioned above, and secondly, the average of six adults from the island of Junk Seylon, where the distinguishing characters of the new subspecies are rather more marked than on the other islands.—Head and body, 235 exact topotypes, 243 Malay States (219,208); tail, 364 exact topotypes, 368 Malay States (323,321); hind-foot, s.u., 46 (41, 40); ear, 27 (27); greatest length of skull, 56 (53·3, 52·6); zygomatic width, 25·4 (24·5, 24); upper molar row (alveoli), 10·3 (9·8, 9·7) mm.

The type measures.—Head and body, 207; tail, 313; hind-foot, 42; ear, 27 mm.

Skull.—Greatest length, 51·4; condylo-basilar length, 44·1; palatilar length, 23·2; length of palatilar foramina, 7·1; zygomatic width, 23·7; median nasal length, 18·8; upper molar row (alveoli), 9·8 mm.

In the colour of the fur *salanga* is exactly like *vociferans*. In *salanga*, the relative length of the tail is very slightly less than in *vociferans*.

Rattus sabanus strepitans (Mill.).

Mus strepitans Miller, Proc. Wash. Acad. Sci. II, 1900, p. 207: Siantan Island.

Distr.—Islands of Siantan and Jimaja, Anamba Islands.

Rattus sabanus bunguranensis Chas.

Rattus sabanus bunguranensis Chasen, Bull. Raffles Mus. 10, 1935, p. 17: Bunguran Island.

Distr.—Bunguran Island, North Natuna Islands.

* **Rattus sabanus mansalaris** Lyon.

Rattus fremens mansalaris Lyon, Proc. U. S. Nat. Mus. LII, 1916, p 450: Mansalar Island.

Distr.—Mansalar Island, West Sumatra.

* **Rattus sabanus tuancus** Lyon.

Rattus fremens tuancus Lyon, Proc. U. S. Nat. Hist. LII, 1916, p. 451: Tuangku Island.

Distr.—Islands of Tuangku and Bankaru, Banjak Islands, West Sumatra.

* **Rattus sabanus masæ** (Mill.).

Mus masae Miller, Smiths. Misc. Coll. XLV, 1903, p. 32: Tana Masa Island.

Distr.—Tana Masa Island, Batu Islands, West Sumatra.

* **Rattus sabanus balæ** (Mill.).

Mus balae Miller, Smiths. Misc. Coll. XLV, 1903, p. 33: Tana Bala Island.

Distr.—Tana Bala Island, Batu Islands, West Sumatra.

Rattus sabanus siporanus (Thos.).

Mus siporanus Thomas, Ann. Mus. Civ. Stor. Nat. Genova, XIX, 1895, p. 670: Sipora Island.

Distr.—Sipora and Siberut Islands, West Sumatra.

Rattus sabanus soccatus (Mill.).

Mus soccatus Miller, Smiths. Misc. Coll. XLV, 1903, p. 30: North Pagi Island.

Distr.—Pagi Islands, West Sumatra.

Rattus sabanus mayapahit Rob. and Kl.

Rattus sabanus mayapahit Robinson and Kloss, Ann. Mag. Nat. Hist. (9), IV, 1919, p. 375: Tjibodas, West Java, 5,000 ft.

Distr.—Java.

Rattus rajah.[1] Rajah Spiny-backed Rat.

Rattus rajah rajah (Thos.).
Mus rajah Thomas, Ann. Mag. Nat. Hist. (6), XIV, 1894, p. 451: Mt. Batu Song, Sarawak.
Distr.—Borneo.

Rattus rajah pellax (Mill.).
Mus pellax Miller, Proc. Biol. Soc. Wash. XIII, 1900, p. 147: Trang, Peninsular Siam.
Distr.—Malay Peninsula; Sumatra (part); Durian Island, Rhio Archipelago.

Rattus rajah similis (Rob. and Kl.).
Epimys similis Robinson and Kloss, Strs. Br. Roy. Asiat. Soc. No. 73, 1916, p. 272: Siolak Daras, Korinchi Valley, West Sumatra, 3,100 ft.
Distr.—Sumatra (part).

Rattus rajah hidongis Kl.
Rattus rajah hidongis Kloss, Treubia, II, 1921, p. 122: Sirhassen Island.
Distr.—Sirhassen Island, South Natuna Islands.

* **Rattus rajah verbeeki Sody.**
Rattus rajah verbeeki Sody, Zool. Meded. (Leiden), XIII, 1930, p. 130: Gedangan, Res. Semarang, Mid-Java.
Distr.—Java.

Rattus surifer. Spiny-backed Rat.

Rattus surifer surifer (Mill.).
Mus surifer Miller, Proc. Biol. Soc. Wash. XIII, 1900, p. 148: Trang, Peninsular Siam.
Distr.—Malay Peninsula; Penang Island; Sumatra (part).

Rattus surifer leonis (Rob. and Kl.).
Mus surifer leonis Robinson and Kloss, Journ. Fed. Malay States Mus. IV, 1911, p. 170: Singapore Island.
Distr.—Singapore Island.

Rattus surifer luteolus (Mill.).
Mus luteolus Miller, Smiths. Misc. Coll. XLV, 1903, p. 36: St. Matthew Island, Mergui Archipelago.
Distr.—Islands of Delisle and Koh Yam Yai (Sugar Loaves), west coast Peninsular Siam.

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[1] *Rattus rajah.* "*Rajah*" has also been recorded from some small islands near the west coast of Borneo (Lamukotan, Datu and Bauwal), but in the absence of specimens I cannot comment on the identifications. A single example from Acheh, North Sumatra is definitely not *similis*, and I cannot see that it differs from *pellax*. I have never seen an example of the Javan race, *verbeeki*.

Rattus surifer casensis (Mill.).

Mus casensis Miller, Smiths. Misc. Coll. XLV, 1903, p. 38: Chance Island, Mergui Archipelago.

Distr.—Islands of Koh Rah and Koh Pra Tung, Takuapah, west coast Peninsular Siam.

Rattus surifer puket Chas.[1]

Rattus surifer puket Chasen, Bull. Raffles Mus. 15, 1940, p. 169: Junk Seylon Island.

Distr.—Junk Seylon and adjacent islet of Sireh; Panjang and Panjang North Islands, and adjacent islet of Koh Boi Yai; Lontar Island, west coast Peninsular Siam.

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[1] *Rattus surifer.* I have before me a beautiful collection of *surifer* rats from the various small islands off the west coast of Peninsular Siam. It will, I hope, receive more detailed attention in the future than that given here. The skins are easily separable into several subspecies.

In a northern group the upper parts are much blackened. Specimens from Delisle and Koh Yam Yai agree so closely with the description of *luteolus* that I have no hesitation in referring them to that form. Skins from Koh Rah, Takuapah, further south, differ from *luteolus* in that they have a well developed, coloured throat band, thus agreeing with the form described from Chance Island, opposite. A few specimens from Pra Tung are included here although the gorget is obsolete, for they are not *surifer*.

On the islands of the Junk Seylon group we have rats brighter in colour and much nearer to typical *surifer* in all their characters. They are even less differentiated than the Langkawi subspecies (*flavidulus*), but nevertheless they cannot be placed under the typical race for they are very much smaller.

Rattus surifer puket subsp. nov.

Type.—Adult male, skin and skull, collected on Junk Seylon Island (also known as Puket), on 19th December, 1917, by an Asiatic collector. Raffles Museum No. 6457.

Measurements.—Adults of long series from the islands of Junk Seylon, Panjang, Lontar and some adjacent islets have the head and body measuring, 146–177 (172); tail, 146–186 (170); hind foot, s.u. 32–39 (36) mm. The measurements in brackets are those of the type the skull of which measures.—greatest length, 43·9; condylo-basilar length, 36·8; palatilar length, 18·5; length of palatal foramina, 6; zygomatic breadth, 19·3; median nasal length, about 16; upper molar row (alveoli), 6·2 mm. In this race the tail is either slightly shorter, or slightly longer than the head and body, and only very rarely is there a coloured band across the throat. The colour is almost exactly like that of typical *surifer*, but when series are compared, the island animals give the impression of being less uniform and more heavily speckled on the upper parts.

Rattus surifer telibon Chas.[1]

Rattus surifer telibon Chasen, Bull. Raffles Mus. 15, 1940, p. 170: Telibon Island.

Distr.—Telibon Island, west coast Peninsular Siam.

Rattus surifer muntia Chas.[2]

Rattus surifer muntia Chasen, Bull. Raffles Mus. 15, 1940, p. 170: Koh (Island) Muk.

Distr.—Muk (or Muntia) Island, Trang, west coast Peninsular Siam.

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[1] **Rattus surifer telibon** subsp. nov.

Sixteen specimens from Telibon Island are near to *surifer*, *puket* and *flavidulus*, but they never have the tail shorter than the head and body. They average rather smaller than typical examples of *surifer*, and average darker on the upper parts than any of the above mentioned races. They are nearest to *flavidulus* as represented by specimens from Terutau Island, but the tail is longer.

Type.—Adult male, skin and skull, collected on Telibon Island, on 2nd January, 1917, by H. C. Robinson. Raffles Museum No. 417/17. 412/17

Measurements.—(type in brackets).—head and body 160–195 (160); tail, 164–204 (179); hind-foot, 38–40 (40); ear, 25·5 mm.

Skull.—Greatest length, 42·1; condylo-basilar length, 34·7; palatilar length, 17·4; length of palatal foramina, 5·7; zygomatic width, 18·7; median nasal length, 14·6; upper molar row (alveoli), 7 mm.

Next we come to a section composed of rats rather different in general appearance from those discussed above. They are diverging from *surifer* along the lines followed by *butangensis*, but are not so much differentiated from the mainland stock as that form. The dull, dark pelage is harsh, and semi-spinous, even on the under parts. The head and body are approximately of the size of *butangensis*, or a trifle smaller, but the tail is longer and usually only just a little shorter than head and body. The skull is rather more heavily ridged than in the mainland form. This diagnosis will serve to distinguish.—

[2] **Rattus surifer muntia** subsp. nov.

Type.—Adult male, skin and skull, collected on Koh (Island) Muk (also known as Pulau Muntia) Trang, west coast Peninsular Siam, on 6th January, 1917, by H. C. Robinson and E. Seimund. Raffles Museum No. 294/17.

Measurements.—(Ten adults; the type in brackets).—head and body, 162–200 (172); tail, 162–182 (165); hind-foot, s.u. 38–41 (41); ear, 22–26 (24) mm. *The skull* of the type measures.—greatest length, 45; condylo-basilar length, 37·9; palatilar

Rattus surifer pidonis Chas.[1]

Rattus surifer pidonis Chasen, Bull. Raffles Mus. 15, 1940, p. 171: Pipidon Island.

Distr.—Pipidon Island, west coast Peninsular Siam.

Rattus surifer butangensis (Mill.).

Mus surifer butangensis Miller, Proc. Biol. Soc. Wash. XIII, 1900, p. 190: Adang Island.

Distr.—Islands of Adang and Rawi, Butang Islands, Straits of Malacca.

Rattus surifer flavidulus (Mill.).

Mus surifer flavidulus Miller, Proc. Biol. Soc. Wash. XIII, 1900, p. 189: Langkawi Island.

Distr.—Islands of Langkawi, Dayang Bunting and Terutau, Straits of Malacca.

Rattus surifer manicalis (Rob. and Kl.).

Epimys surifer manicalis Robinson and Kloss, Ann. Mag. Nat. Hist. (8), XIII, 1914, p. 230: Koh (Island) Pennan.

Distr.—Koh Pennan, North-East Malay Peninsula.

Rattus surifer spurcus (Rob. and Kl.).

Epimys surifer spurcus Robinson and Kloss, Ann. Mag. Nat. Hist. (8), XIII, 1914, p. 230: Koh (Island) Samui.

Distr.—Koh Samui, North-East Malay Peninsula.

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length, 18·8; length of palatal foramina, 6·4; zygomatic breadth, 20·2; median nasal length, 16·9; upper molar row (alveoli) 6·7; height of braincase, 4·5; breadth of braincase 16·3 mm.

[1] **Rattus surifer pidonis** subsp. nov.

Like *R. s. muntia* but with an orange-buff throat band; the upper parts darker, and tending to become more uniform in colour, the foreback and rump often nearly solidly dull brown. The skulls of the two forms are markedly different when viewed in series. In *muntia* the brain case is narrow and relatively flattened; in *pidonis* it is broader and more globular. The differences appear small when expressed in figures, but large when the two series of skulls are laid out and viewed from above.

Type.—Adult female, skin and skull, collected on Koh (Island) Pipidon, west coast Peninsular Siam, on 6th February, 1919, by H. C. Robinson and E. Seimund. Raffles Museum No. 207/19.

Measurements.—Eighteen adults (type in brackets).—head and body, 173–215 (199); tail, 166–196 (178); hind-foot, s.u. 38–42 (40); ear, 24. *The skull* of the type measures.—44·6; condylo-basilar length, 38; palatilar length 18·6; length palatal foramina, 6·5; zygomatic breadth, 19·9; median nasal length, 17·5; upper molar row (alveoli), 6.7; height of braincase, 13; width of braincase, 16·8 mm.

Rattus surifer flavigrandis (Kl.).
Mus surifer flavigrandis Kloss, Ann. Mag. Nat. Hist. (8), VII, 1911, p. 119: East Perhentian Island.
Distr.—East Perhentian Island, off Trengganu, east coast Malay Peninsula.

Rattus surifer grandis (Kl.).
Mus surifer grandis Kloss, Ann. Mag. Nat. Hist. (8), VII, 1911, p. 119: Great Redang Island.
Distr.—Great Redang Island, off Trengganu, Rhio Archipelago.

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Rattus surifer binominatus (Kl.).
Mus (surifer) microdon Kloss, Journ. Fed. Mal. States Mus. II, 1908, p. 145: Tioman Island (not *Mus microdon* Peters, 1852).
Epimys surifer binominatus Kloss, Journ. Fed. Mal. States Mus. V, 1915, p. 223: *nom. nov.*
Distr.—Tioman Island, off Pahang, east coast Malay Peninsula.

Rattus surifer pemangilis (Rob.).
Epimys surifer pemangilis Robinson, Ann. Mag. Nat. Hist. (8), X, 1912, p. 593: Pemanggil Island.
Distr.—Pemanggil Island, off Johore, east coast Malay Peninsula.

Rattus surifer aoris (Rob.).
Epimys surifer aoris Robinson, Ann. Mag. Nat. Hist. (8), X, 1912, p. 594: Aor Island.
Distr.—Aor Island, off Johore, east coast Malay Peninsula.

Rattus surifer anambæ (Mill.).
Mus anambae Miller, Proc. Wash. Acad. Sci. II, 1900, p. 205: Jimaja Island.
Distr.—Islands of Jimaja and Siantan; Anamba Islands; ? Midai Island, Natuna Islands (*subsp. incert.*).

Rattus surifer ravus Rob. and Kl.
Epimys ravus Robinson and Kloss, Journ. Strs. Br. Roy. Asiat. Soc. No. 73, 1916, p. 272: Sungai Kumbang, Korinchi, Sumatra, 4,700 ft.
Distr.—Sumatra (part).

Rattus surifer lingensis (Mill.).[1]
Mus lingensis Miller, Proc. Wash. Acad. Sci. II, 1900, p. 206: Lingga Island.
Distr.—Islands of the Rhio-Lingga Archipelagos (Bintang, Mapor, Batam, Sugi, Moro, Chombol, Durian, Karimon, Kundur, Bakong, Sebang, Lingga, Penuba, Singkep).

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[1] *Rattus surifer lingensis.* This race has been recorded from Sumatra, and it is possible that it occurs on the east coast. But a single specimen from Acheh, North Sumatra though definitely not *ravus*, is referable to *surifer* rather than to *lingensis*. All Sumatran "*lingensis*" now need comparison with *R. rajah similis*.

Rattus surifer natunæ Chas.[1]
Rattus surifer natunae Chasen, Bull. Raff. Mus. 15, 1940, p. 173: Bunguran Island.
Distr.—Bunguran Island, North Natuna Islands; ? islands of Laut and Lingung, North Natuna Islands (*subsp. incert.*).

* **Rattus surifer catellifer (Mill.).**
Mus catellifer Miller, Proc. U. S. Nat. Mus. XXVI, 1903, p. 464: Mansalar Island.
Distr.—Mansalar Island, West Sumatra.

* **Rattus surifer banacus Lyon.**
Rattus lingensis banacus Lyon, Proc. U. S. Nat. Mus. LII, 1916, p. 449: Bangkaru Island.
Distr.—Bangkaru Island, Banjak Islands, West Sumatra.

* **Rattus surifer antucus Lyon.**
Rattus lingensis antucus Lyon, Proc. U. S. Nat. Mus. LII, 1916, p. 449: Tuangku Island.
Distr.—Tuangku Island, Banjak Islands, West Sumatra.

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[1] **Rattus surifer natunæ** subsp. nov.

Size about as in *surifer*, but much duller in colour and nearest to *lingensis* in general appearance. The colour is, however, even less bright than in *lingensis* in all conditions of pelage. The tail is relatively longer than in *lingensis*, and usually only a trifle shorter than the head and body; exceptionally, it may just exceed the head and body in length. The white of the thigh is continuous with that of the foot. There is no coloured throat band (one specimen has a coloured spot on the throat).

Type.—Adult male, skin and skull, collected on Bunguran Island, North Natuna Islands, on 22nd August, 1928, by F. N. Chasen. Raffles Museum No. 557.

Remarks.—Eleven adults from Bunguran give the following measurements.—head and body, 208, 176–220 (197); tail, 202, 164–202 (185); hind-foot, s.u., 42, 37–44; ear, 25, 24–27 mm. The four largest skulls measure.—greatest length, 48·5–50·5; zygomatic breadth, 21·8–23·5; upper molar row (alveoli), 6·5–7·8 mm. Other measurements are given in Bull. Raffles Mus. 10, 1935. p. 38.

The first measurement given above is that of the type; then follows the range of measurements of the series with the average in brackets.

The skull of the type measures.—Greatest length, 50·5; condylo-basilar length 42·2; palatilar length, 20·7; length palatal foramina, 7; zygomatic width, 23; median nasal length, about 18·7; upper molar row (alveoli) 7·8 mm.

* **Rattus surifer pinacus Lyon.**
Rattus lingensis pinacus Lyon, Proc. U. S. Nat. Mus. LII, 1916, p. 450: Pinie Island.
Distr.—Pinie Island, Batu Islands, West Sumatra.

* **Rattus surifer mabalus Lyon.**
Rattus lingensis mabalus Lyon, Proc. U. S. Nat. Mus. LII, 1916, p. 449: Tana Masa Island.
Distr.—Islands of Tana Masa and Tana Bala, Batu Islands, West Sumatra.

Rattus surifer pagensis (Mill.).
Mus pagensis Miller, Smiths. Misc. Coll. XLV, 1903, p. 39: South Pagi Island.
Distr.—Mentawi Islands (Pagi Islands; Sipora; Siberut).

Rattus surifer bandahara Rob.
Rattus bandahara Robinson, Ann. Mag. Nat. Hist. (9), VII, 1921, p. 235: Mt. Kina Balu, North Borneo.
Distr.—Borneo.

Rattus surifer panglima Rob.[1]
Rattus panglima Robinson, Ann. Mag. Nat. Hist. (9), VII, 1921, p. 235: Palawan Island.
Distr.—North Bornean islands of Banguey, Balambangan and Mallewallé.

* **Rattus surifer saturatus (Lyon).**
Epimys saturatus Lyon, Proc. U. S. Nat. Mus. XL, 1911, p. 109: Panebangan Island.
Distr.—Panebangan Island, West Borneo.

* **Rattus surifer carimatæ (Mill.).**
Mus carimatae Miller, Proc. U. S. Nat. Mus. XXXI, 1906, p. 59: Karimata Islands.
Distr.—Karimata Island; Pelapis Island, West Borneo.

Rattus surifer serutus (Mill.).
Mus serutus Miller, Proc. U. S. Nat. Mus. XXXI, 1906, p. 591: Serutu Island.
Distr.—Serutu Island, Karimata Islands.

Rattus surifer perflavus (Lyon).
Epimys perflavus Lyon, Proc. U. S. Nat. Mus. XL, 1911, p. 108: Laut Island.
Distr.—Laut Island, South-East Borneo.

* **Rattus surifer ubecus (Lyon).**
Epimys ubecus Lyon, Proc. U. S. Nat. Mus. XL, 1911, p. 109: Sebuko Island.
Distr.—Sebuko Island, South-East Borneo.

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[1] *R. surifer panglima.* No direct comparison has been made with exact topotypes of *panglima* and specimens from the North Bornean Islands: they are probably distinct.

Rattus surifer solaris Sody.[1]
Rattus surifer solaris Sody, Natuur. Tijdschr. Ned. Ind. XCIV, 1934, p. 170: Gunong Gedeh, West Java, 1,350 m.
Distr.—Java.

Rattus inflatus (Rob. and Kl.). Korinchi Rat.
Epimys inflatus Robinson and Kloss, Journ. Strs. Br. Roy. Asiat. Soc. No. 73, 19, p. 273: Korinchi Peak, West Sumatra, 4,700 ft.
Distr.—Sumatra.

Rattus cremoriventer. Pencil-tailed Rat.

Rattus cremoriventer cremoriventer (Mill.).
Mus cremoriventer Miller, Proc. Biol. Soc. Wash. XIII, 1900, p. 144: Trang, Peninsular Siam.
Distr.—Malay Peninsula; islands of Langkawi and Adang, Straits of Malacca.

* **Rattus cremoriventer flaviventer** (Mill.).
Mus flaviventer Miller, Proc. Wash. Acad. Sci. II, 1900, p. 204: Jimaja Island.
Distr.—Jimaja Island, Anamba Islands.

* **Rattus cremoriventer barussanus** (Mill.).
Epimys barussanus Miller, Proc. Biol. Soc. Wash. XXIV, 1911, p. 26: Nias Island.
Distr.—Nias Island, West Sumatra.

* **Rattus cremoriventer mengurus** (Mill.).
Epimys mengurus Miller, Proc. Biol. Soc. Wash. XXIV, 1911, p. 27: Billiton Island.
Distr.—Billiton and Banka Islands.

Rattus cremoriventer sumatræ Bart.
Rattus cremoriventer sumatrae M. Bartels Jr., Natuur. Tijdschr. Ned. Ind. XCVII, 1937, p. 123: Bandjarnegri, Wai Semangka, Lampoengs, South Sumatra.
Distr.—Sumatra.

Rattus cremoriventer kina (Bonh.).
Mus kina Bonhote, Ann. Mag. Nat. Hist. (7), XI, 1903, p. 124: Mt. Kinabalu, North Borneo.
Distr.—Borneo.

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[1] *Rattus surifer solaris.* Some of the points raised by Mr. Sody in his original description of this form are difficult to appreciate. The difficulty experienced by Kloss in trying to separate a Javan series of *surifer* from Sumatran topotypes of *ravus* still occurs when the material in the Raffles Museum is examined. *Rattus surifer* is the most variable of the rat species known to me and series are very necessary for racial identification. The Sumatran *ravus* is especially variable in colour, and in Javan specimens I find that the extremes and the range are almost the same as in *similis.* But as a series the Javan skins are a trifle paler yellow and less richly coloured, and no adult specimen is so blackened on the back as some from Sumatra. I have no doubt that Kloss considered the differences insignificant; and they are indeed very slight.

Rattus cremoriventer malawali Chas. and Kl.
Rattus cremoriventer malawali Chasen and Kloss, Bull. Raff. Mus., 6, 1931, p. 32: Mallewallé Island.
Distr.—North Bornean Islands of Banguey, Balambangan and Mallewallé.

* **Rattus cremoriventer spatulatus (Lyon).**
Epimys spatulatus Lyon, Proc. U. S. Nat. Mus. XL, 1911, p. 116: Lamukotan Island.
Distr.—Lamukotan Island, West Borneo.

Rattus cremoriventer cretaceiventer Rob. and Kl.
Rattus cremoriventer cretaceiventer Robinson and Kloss, Ann. Mag. Nat. Hist. (9), IV, 1919, p. 377: Tjibodas, West Java, 4,500 ft.
Distr.—Java.

Rattus rapit.[1] Long-tailed Rat.

Rattus rapit rapit (Bonh.).
Mus rapit Bonhote, Ann. Mag. Nat. Hist. (7), XI, 1903, p. 123: Mt. Kinabalu, North Borneo.
Distr.—Borneo.

Rattus rapit fraternus (Rob. and Kl.).
Epimys fraternus Robinson and Kloss, Journ. Strs. Br. Roy. Asiat. Soc. No. 73, 1916, p. 373: Korinchi Peak, West Sumatra, 4,700 ft.
Distr.—Sumatra.

Rattus rapit orbus (Rob. and Kl.).
Epimys orbus Robinson and Kloss, Ann. Mag. Nat. Hist. XIII, 1914, p. 228: Khao Nawng, Bandon, Peninsular Siam, 3,500 ft.
Distr.—Peninsular Siam.

Rattus rapit cameroni Chas.[2]
Rattus rapit cameroni Chasen, Bull. Raff. Mus. 15, 1940, p. 176: Cameron Highlands, Malay States.
Distr.—Malay States.

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[1] *Rattus rapit.* Some systematists would certainly treat most of the forms here regarded as subspecies, as "representative species", although all would probably agree that the relationship between *orbus* and *fraternus* is only subspecific. It has been admitted that when *orbus* was described *gracilis* was overlooked, and the two forms seem very much alike and are not improbably inseparable. The Terutau form, which I have never seen, is here regarded as *rapit* purely on a study of the description: animals from the island and the mainland are not likely to belong to one race.

[2] **Rattus rapit cameroni** subsp. nov.

Type.—Adult male, skin and skull, collected at the Cameron Highlands, Pahang, Malay States, about 5,000 ft., on 31st May, 1931, by a Dyak collector. Raffles Mus. No. 6466.

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* **Rattus rapit solus (Mill.).**

Epimys solus Miller, Smiths. Misc. Coll. LXI, 21, 1913, p. 22: Terutau Island.

Distr.—Terutau Island, Straits of Malacca.

Rattus rapit lepturus (Jent.).

Mus lepturus Jentinck, Notes Leyd. Mus. II, 1879, p. 17: Mt. Gede, West Java.

Distr.—Java (part).

* **Rattus rapit maculipectus Sody.**

Rattus lepturus maculipectus Sody, Natuur. Tijdschr. Ned. Ind. XCIV, 1934, p. 173: Mt. Tjereme, West Java, 2,600 m.

Distr.—Java (part).

* **Rattus rapit fredericæ Sody.**

Rattus lepturus fredericae Sody, Natuur. Tijdschr. Ned. Ind. XCI, 1931, p. 212: Mt. Salak, West Java, 2,000 m.

Distr.—Java (part).

Measurements of a male and female (type first).—Head and body, 152, 154; tail, 263, 241; hind-foot, s.u. 37, 32; ear, 25, 26 mm.

Skull.—Greatest length, 41·5, 41; condylo-basilar length, 34·3, 33·5; palatilar length, 18, 17·5; length of palatal foramina, 7·5, 6·8; zygomatic width, 17·3, 17·8; median nasal length, 16, 15·2; upper molar row (alveoli), 7·2, 7·2 mm.

Remarks.—The Bornean race, *rapit*, is unique on account of its distinctly tufted tail, and together with *cameroni* from the mountains of the Malay States, differs from *orbus, fraternus* and the Javan forms (*lepturus* etc.) by reason of the *very narrow infraorbital plate and lightly built zygomata.* This division of the species into two well-marked sections is rather disturbing, but nowhere have two forms of this long-tailed rat been taken in one locality.

Cameroni is much larger than *rapit*, and lacks the conspicuous tail-tuft of that form. Both have the infraorbital plate not more than 3 mm. broad at the widest, outside, measurement, and its anterior edge is much straighter and more perpendicular than in *orbus* etc. In South Annam there is a form of this species which for the moment I must regard as "*confucianus*". It is duller in colour than *cameroni:* the skull has much larger bullæ, and the broad infraorbital plate of the *orbus* section.

Rattus bukit.[1] Bonhote Rat.

Rattus bukit bukit (Bonh.).
Mus bukit Bonhote, Ann. Mag. Nat. Hist. (7), XI, 1903, p. 125: Bukit Besar, Jalor, Patani, 2,500 ft.
Distr.—Malay Peninsula.

Rattus bukit pan (Rob. and Kl.).
Epimys jerdoni pan Robinson and Kloss, Ann. Mag. Nat. Hist. (8), XIII, 1914, p. 229: Koh (Island) Samui.
Distr.—Samui Island, North-East Malay Peninsula.

Rattus bukit lieftincki Chas.
Rattus bukit lieftincki Chasen, Treubia, XVII, 1939, p. 208: Atjeh, North Sumatra, 1,000 m.
Distr.—Sumatra (part).

* **Rattus bukit jacobsoni** Bart.
Rattus bukit jacobsoni M. Bartels Jr., Natuur. Tijdsch. Ned. Ind. XCVII, 1937, p. 121:—Mt. Tanggamoes, Lampoengs, South Sumatra, about 700 m.
Distr.—Sumatra (part).

Rattus bukit treubii Rob. and Kl.
Rattus bukit treubii Robinson and Kloss, Ann. Mag. Nat. Hist. (9), IV, 1919, p. 476: Tjibodas, Mt. Gede, West Java, 5,000 ft.
Distr.—Java (part).

Rattus bukit besuki Sody.
Rattus lepturus besuki Sody, Natuur. Tijdschr. Ned. Ind. XCI, 1931, p. 214: Ongop-ongop, Idjen, East Java, 1850 m.
Rattus bukit lepturoides Sody, Natuur. Tijdschr. Ned. Ind. XCIV, 1934, p. 174: Mt. Lawu, Mid Java, 2,000 m.
Distr.—Java (part).

Rattus bukit temmincki Kl.
Rattus bukit temmincki Kloss, Journ. Fed. Mal. States Mus. X, 1921, p. 233: Banjoewangi, Besoeki, East Java.
Distr.—Java (part).

Rattus bukit baturus Sody.
Rattus bukit baturus Sody, Natuur. Tijdschr. Ned. Ind. XCII, 1932, p. 334: Bali.
Distr.—Bali.

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[1] *Rattus bukit.* For the species name I have used one of which I am certain, but have no doubt that there is an older, extralimital, name available. My knowledge of the Indian spiny backed rats is very slight, but I think that perhaps *blythi* (*cinnamomeus*) and *lepidus* of Tenasserim are forms of this species. Some authors have used *jerdoni* (or *fulvescens*) as the species name, but I am not sure that these authors have appreciated the fact that there are *two* distinct species (here called *bukit* and *rapit*) of these closely allied rats, each with its numerous subspecies, running through Indochina and Malaysia, and often occurring together.

Rattus alticola.[1] Mountain Rat.

Rattus alticola alticola (Thos.).

Mus alticola Thomas, Ann. Mag. Nat. Hist. (6), II, 1888, p. 408: Mt. Kinabalu, British North Borneo (from a high level).

Distr.—Borneo (part).

Rattus alticola kinabaluensis Chas.

Rattus alticola kinabaluensis Chasen, Bull. Raffles Mus. 13, 1937, p. 81: Mt. Kinabalu, British North Borneo, 5,500 ft.

Distr.—Borneo (part).

Rattus alticola ochraceiventer (Thos.).

Mus ochraceiventer Thomas, Ann. Mag. Nat. Hist. (6), XIV, 1894, p. 451: Mt. Kinabalu, British North Borneo, below 3,000 ft.

Distr.—Borneo (part).

Rattus alticola inas (Bonh.).

Mus inas Bonhote, Proc. Zool. Soc. 1906, p. 9: Mt. Inas, Perak.

Distr.—Malay States.

Rattus alticola hylomyoides (Rob. and Kl.).

Epimys hylomyoides Robinson and Kloss, Journ. Strs. Br. Roy. Asiat. Soc. No. 73, 1916, p. 273: Korinchi Peak, West Sumatra, 7,300 ft.

Distr.—Sumatra.

Rattus bæodon (Thos.). Small Spiny-backed Rat.

Mus baeodon Thomas, Ann. Mag. Nat. Hist. (6), XIV, 1894, p. 452: Mt. Kinabalu, North Borneo.

? *Rattus trachynotus* Cabrera, Bole. Soc. espan. Hist. Nat. XX, 1920, p. 212: Mt. Kinabalu, North Borneo.

Distr.—Borneo.

Rattus bartelsii. Bartels Rat.

Rattus bartelsii bartelsii (Jent.).

Mus bartelsii Jentink, Notes Leyd. Mus. XXXIII, 1910, p. 69: Mt. Pangerango-Gede, West Java.

Rattus bartelsi tijbuniensis Sody, Ann. Mag. Nat. Hist. (10), XII, 1933, p. 430: Tjiboeni, Bandoeng, West Java, 1,350 m. *See* also Sody, Nat. Tijdschr. Ned. Ind. XCIV, 1934, p. 177.

Distr.—Java (part).

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[1] *Rattus alticola.* The altitudinal ranges in Borneo are discussed in the original description of *kinabaluensis.* In Sarawak, *ochraceiventer* is found in the lowlands, but it has not yet been taken at sea-level in North Borneo, where it is, at least largely, replaced by *R. baeodon,* which however, is far too distinct to be treated as a subspecies. *Inas* and *hylomyoides* are very distinct forms and most systematists would, I think, regard them as "representative species", rather than subspecies. *R. bartelsii* is perhaps the Javan representative of the *alticola* artenkreise, but it differs from the other members so much, that in spite of my broad views on the function of trinomials, it is here treated as a species. It is the genotype of *Maxomys* Sody, Natuur. Tijds. Ned. Ind. XCVI, 1936, p. 55.

*** Rattus bartelsii obscuratus Bartels.**

Rattus bartelsii obscuratus M. Bartels Jr., Treubia, XVI, 1938, p. 323: Mt. Slamat, Central Java.

Distr.—Java (part).

Rattus whiteheadi.[1] Whitehead Rat.

Rattus whiteheadi whiteheadi (Thos.).

Mus whiteheadi Thomas, Ann. Mag. Nat. Hist. (6), XIV, 1894, p. 452: Mt. Kinabalu, North Borneo.

Epimys whiteheadi perlutus Thos., Ann. Mag. Nat. Hist. (8), 7, 1911, p. 205: Balingean, Sarawak.

? *Rattus melinogaster* Cabrera, Bole. Real. Soc. espan. Hist. nat. XX, 1920, p. 211: Mt. Kinabalu.

Distr.—Sumatra (part); Borneo and coastal islands of Bauwal (south-west), and Sebuko (south-east); Banka and Billiton (but specimens from these two islands not examined).

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[1] *Rattus whiteheadi.* I have several hundreds of these rats from various parts of Malaysia. The species is, everywhere, so variable in colour that I have much sympathy with the view put forward by Robinson and Kloss in 1918 (Journ. F.M.S. Mus. VIII, p. 2, 1918, p. 50) wherein all specimens from Borneo, Sumatra, and the Malay Peninsula are lumped as *whiteheadi*, but with far more material at my disposal than was available to these authors I now think that their merging treatment is too drastic and that a number of races must be recognized. My experience of Bornean *whiteheadi* is confined to specimens from the type locality, other parts of British North Borneo, and Sarawak. In the great majority of cases topotypical *whiteheadi* is rufous on the under parts, and series for series *asper* shows up as duller on the upper parts, and much less rufous below; *asper* in fact is usually grey, or at the most merely washed with rust colour on the under parts. Brightly rufous specimens such as are common, and in a majority in Borneo, are very rare in the Malay Peninsula. It is true that grey-bellied specimens are likely to turn up in most places in Sumatra, but looking over the collections there can be no doubt that West Sumatra must be included in the range of *whiteheadi* and not *asper*. There are, however, two complicating factors in Sumatra, both mentioned below.

From the Rhio Archipelago a form (*batamanus*) has been described in which the under parts are grey and the *skull is noticeably larger* than in *whiteheadi*. This form seems curiously rare in its type locality and it is imperfectly known. It seems to extend to the adjacent low country and coastal islands of central east Sumatra. I have never seen topotypes.

From extreme North Sumatra I have specimens like *mandus* and *batamanus* in size and also with dark upper parts, but with strongly rufous under parts as in *whiteheadi*. On description I cannot separate these Acheh specimens from *batus*.

The small island of Mallewallé off the north point of Borneo produces very dark specimens and not one of four adult skins can be even approximately matched in the large collection from other parts of the range. They are very dark above and distinctly blackened on the mid-dorsal line. On the under parts they are a mixture of blackish grey and rusty brown with the grey predominating. Specimens from the adjacent islands of

Rattus whiteheadi asper (Mill.).
Mus asper Miller, Proc. Biol. Soc. Wash. XIII, 1900, p. 145: Trang, Peninsular Siam.
Rattus klossi Bonh., Proc. Zool. Soc. 1906, p. 9: Johore.
Distr.—Malay Peninsula.

*** Rattus whiteheadi batamanus (Lyon).**
Mus batamanus Lyon, Proc. U. S. Nat. Mus. XXXI, 1907, p. 654: Batam Island.
Mus mandus Lyon, Proc. U. S. Nat. Mus. XXXIV, 1908, p. 644: Sungai Mandau, East Sumatra.
Distr.—Islands of Batam and Setoko, Rhio Archipelago; Sumatra (part); islands of Rupat and Padang, East Sumatra.

Rattus whiteheadi batus (Mill.).
Epimys batus Miller, Proc. Biol. Soc. Wash. XXIV, 1911, p. 27: Pinie Island.
Distr.—Tuanku Island, Banjak Islands; Nias Island; islands of Tana Balu, Tana Masa and Pinie, Batu Islands; Sumatra (part).

Rattus whiteheadi piratæ Chas.[1]
Rattus whiteheadi piratae Chasen, Bull. Raffles Mus. 15, 1940, p. 181: Mallewallé Island.
Distr.—North Bornean Islands of Mallewallé, Balambangan and Banguey.

Banguey and Balambangan are exactly like *asper* on the under parts but they are rather darker above and although less differentiated from the mainland form are best put with the Mallewallé subspecies which can be known as——.

[1] **Rattus whiteheadi piratæ** subsp. nov.

Type.—Adult male, skin and skull, collected on Mallewallé Island, British North Borneo, on 9th September, 1927, by C. Boden Kloss and F. N. Chasen. Raffles Mus. No. 3452.

A fuller description of the type and the series is given in Bull. Raff. Mus. 6, 1931, pp. 32 and 68.

Finally, on Sirhassen Island in the South China Sea there is a race which differs from *whiteheadi* and *asper*, and resembles *batamanus* and *piratae* in its dark upper parts, usually grey under parts, and large skull. It is, however, peculiar in that the flanks are just as deeply coloured as the back, and there is a rather sharp line of demarcation between the dark upper and pale lower zones of colour. This last character distinguishes seven out of nine Sirhassen skins from all other examples of the species before me. The two remaining skins can be matched on the under parts by some examples of *whiteheadi* and *asper*.

The Sirhassen race can be known as.—

Rattus whiteheadi subitus Chas.[1]
Rattus whiteheadi subitus Chasen, Bull. Raffles Mus. 15, 1940, p. 182: Sirhassen Island.
Distr.—Sirhassen Island, South Natuna Islands.

Rattus edwardsi. Edwards Giant Rat.

[**Rattus edwardsi edwardsi (Thos.).**
Mus edwardsi Thomas, Proc. Zool. Soc. 1882, p. 587, pl. 44: Fukien, China.
Distr.—Extralimital.]

Rattus edwardsi ciliatus (Bonh.).
Mus ciliata Bonhote, Proc. Zool. Soc. 1900, p. 879: Mt. Inas, Perak, Malay States.
Distr.—Malay States.

Rattus edwardsi setiger (Rob. and Kl.).
Epimys setiger Robinson and Kloss, Journ. Strs. Br. Roy. Asiat. Soc. No. 73, 1916, p. 271: Barong Bharu, Barisan Range, Korinchi, West Sumatra, 4,000 ft.
Distr.—Sumatra.

Rattus norvegicus.[2] Brown Rat; Norway Rat.

Rattus norvegicus norvegicus (Erxl.).
Mus norvegicus Erxleben, Syst. Regni Anim. I, 1777, p. 381: Norway.
Distr.—Malay States; Sumatra; Borneo; Java; Bali.

Rattus bowersii. Bowers Giant Rat.

[**Rattus bowersii bowersii (And.).**
Mus bowersii Anderson, Anat. Zool. Research West Yunnan, I, 1878, p. 304, pl. XVII: Yunnan.
Distr.—Extralimital.]

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[1] **Rattus whiteheadi subitus** subsp. nov.

Type.—Adult male, skin and skull, collected on Sirhassen Island, South Natuna Islands, on 20th August, 1931, by P. M. de Fontaine. Raffles Mus. No. 846.

Further details, and measurements, of the type series can be found in Bull. Raffles Mus. 10,1935, pp. 19 and 39. The type is the third male in the column of measurements (greatest length of skull, 34·6 mm.).

[2] *Rattus norvegicus.* Known in many countries as the common rat, and technically, but erroneously, almost as well known, especially in medical literature, as *R. decumanus.* According to Hinton its real home is in temperate Asia, where several wild subspecies occur. It has spread with shipping and commerce to all countries, but meets with most success as a colonist in temperate lands. In warm regions it is frequently unable to displace *R. rattus.* In Singapore and most other Malayan ports the typical form of *norvegicus* is common and in restricted areas in the towns and their immediate vicinity it is often the dominant species, although the local race of *R. rattus* is always found, commonly, in close proximity. It is also established in many places on the mainland. Said to occur in the Cocos-Keeling Islands. ? *Mus javanus* Herm. 1904 (*non vid.*).

Rattus bowersii ferreocanus (Mill.).
Mus ferreocanus Miller, Proc. Biol. Soc. Wash. XIII, 1900, p. 140: Trang, Peninsular Siam, 3,000 ft.
Distr.—Malay Peninsula.

Rattus canus. Grey Rat.

Rattus canus canus (Mill.).
Lenothrix canus Miller, Proc. U. S. Nat. Mus. XXVI, 1903, p. 466: Tuangku Island.
Distr.—Tuangku Island, Banjak Islands, West Sumatra.

Rattus canus malaisia Kl.
Rattus canus malaisia Kloss, Bull. Raffles Mus. 5, 1931, p. 105: near Kuala Lumpur, Selangor, Malay States.
Distr.—Malay States; Borneo.

Rattus canus sodyi Bartels.
Rattus canus sodyi M. Bartels, Jr., Treubia, XVI, 1937, p. 45: Mt. Pangrango-Gede, West Java, 1,000 m.
Distr.—Java.

Rattus nativitatis (Thos.).[1] Christmas Island Rat.
Mus nativitatis Thomas, Proc. Zool. Soc. 1888, p. 533: Christmas Island.
Distr.—Christmas Island, Indian Ocean.

Genus MUS Linn. 1758

Mus musculus.[2] House Mouse.

Christmas Island

[**Mus musculus musculus Linn.**
Mus musculus Linn., Syst. Nat. 10th ed. 1758, p. 62: Sweden.
Distr.—Extralimital.]

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[1] *Rattus nativitatus.* Apparently without near relatives in Malaysia and in some respects a link between *Rattus* and *Uromys.*

[2] *Mus musculus.* A house mouse is well established in the ports and certain inland localities in many parts of Malaysia, but with one exception mentioned below, I know of the species only in association with man. Local adults, even from houses, are washed with ochraceous on the under parts, and I have not yet seen a specimen that could without hesitation be referred to the grey-bellied form found in indoor localities in Europe, although it is certain that such animals must reach eastern ports on ships. Maybe the immigrants are like those of *R. rattus*, rapidly absorbed by the local race. Various names have been applied to "*musculus*", in British India, of which *homoourus* Hodgs. (Ann. Mag. N. H. XV, 1845, p. 268) has page priority over *urbanus* of the same author, p. 269, although some writers on Indian mammals continue to use the latter name. Until the Indian races have been thoroughly studied and reviewed I use *rama* which is of certain application, for it is highly improbable that mice from Nepal to Ceylon and east to Celebes are inseparable racially. The species is said to occur in the Cocos-Keeling Islands.

There is in Java a mouse in which the underside is whitish, or silvery white. It has been named *ouwensi* Kl., but little is known of it: it seems to be a true *Mus*, and is reputed to be a field mouse. The few specimens I have seen are all from Java.

Mus musculus rama Cantor.
Mus rama Cantor in Blyth, Journ. Asiat. Soc. Beng. XXXIV, pt. 2, 1865, p. 194: Penang.
Distr.—Malay States; Sumatra; Java; Bali; Banka; Borneo; Sirhassen Island, South Natuna Islands.

Mus musculus ouwensi Kl.
Mus (musculus ?) ouwensi Kloss, Treubia, II, 1921, p. 120: Probolinggo, East Java.
Distr.—Java.

Genus CHIROPODOMYS Peters, 1868.[1]

Chiropodomys gliroides. Tree Mice.

[**Chiropodomys gliroides gliroides** (Blyth).
Mus gliroides Blyth, Journ. Asiat. Soc. Beng. XXIV, 1855, p. 721: Assam.
Distr.—Extralimital.]

Chiropodomys gliroides peguensis (Blyth).
Mus peguensis Blyth, Journ. Asiat. Soc. Beng. XXVIII, 1859, p. 295: Shwegyin, Burma.
Distr.—Malay States; Sumatra; Bunguran Island, North Natuna Islands.

Chiropodomys niadis Mill.
Chiropodomys niadis Miller, Smiths. Misc. Coll. XLV, 1903, p. 40: Nias Island.
Distr.—Nias Island, West Sumatra.

Chiropodomys anna Thos. and Wrought.
Chiropodomys anna Thomas and Wroughton, Proc. Zool. Soc., Abstract, 1909, p. 19: Tjilatjap, West Java.
Distr.—Java.

Chiropodomys major Thos.
Chiropodomys major Thomas, Ann. Mag. Nat. Hist. (6), XI, 1893, p. 344: Sadong, Sarawak.
Distr.—Borneo.

Chiropodomys legatus Thos.
Chiropodomys legatus Thomas, Ann. Mag. Nat. Hist. (8), VII, 1911, p. 206: Mt. Kinabalu, North Borneo.
Distr.—Borneo.

Leggada booduga Gray, has been recorded from Sumatra, but I submit that further evidence is required before the species is admitted to the Malaysian list.

[1] *Chiropodomys.* I have seen so few examples of this genus from Malaysia, that no reconstruction of the genus is here attempted. The Malayan form is perhaps rather brighter and larger than *peguensis*, but few specimens are known. The four Bornean forms seem well founded, and other forms will almost certainly turn up in Sumatra and the Malay States. The Natuna Island identification is based on an old letter written by Oldfield Thomas. The Sumatran race is assumed to be *peguensis* purely on zoogeographical grounds: it has been recorded as *gliroides*.

Chiropodomys pictor Thos.
Chiropodomys pictor Thomas, Ann. Mag. Nat. Hist. (8), VII, 1911, p. 207: Mt. Kinabalu, North Borneo.
Distr.—Borneo.

Chiropodomys pusillus Thos.
Chiropodomys pusillus Thomas, Ann. Mag. Nat. Hist. (6), XI, 1893, p. 345: Mt. Kinabalu, North Borneo, 1,000 ft.
Distr.—Borneo.

Genus HÆROMYS Thomas, 1911.

Hæromys margarettæ (Thos.).[1] Ranee Mouse.
Mus Margarettae Thomas, Ann. Mag. Nat. Hist. (6), XI, 1893, p. 346; Penrissen Hills, West Sarawak.
Distr.—Borneo.

Hæromys pusillus (Thos.).
Mus Margarettae pusillus Thomas, Ann. Mag. Nat. Hist. (6), XII, 1893, p. 232: Mt. Kinabalu, North Borneo.
Distr.—Borneo.

Genus HAPALOMYS Blyth, 1859.

Hapalomys longicaudatus Blyth. Berdmore Rat.
Hapalomys longicaudatus Blyth, Journ. Asiat. Soc. Beng. XXVIII, 1859, p. 296: Sittang Valley, Tenasserim.
Distr.—Malay Peninsula.

Genus MYCTEROMYS Rob. and Kloss, 1918.[2]

Mycteromys crociduroides. Shrew-like Rat.

Mycteromys crociduroides crociduroides (Rob. and Kl.).
Oromys crociduroides Robinson and Kloss, Journ. Str. Br. Roy. Asiat. Soc. No. 73, 1916, p. 271: Korinchi Peak, West Sumatra, 10,000 ft.
Distr.—Sumatra.

Mycteromys crociduroides vulcani Rob. and Kl.
Mycteromys crociduroides vulcani Robinson and Kloss, Ann. Mag. Nat. Hist. (9), IV, 1919, p. 378: Mt. Gede, West Java, 7,900 ft.
Distr.—Java.

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[1] *Haeromys.* There is as yet no evidence to support the view that the two known forms are subspecies.

[2] *Nom. nov.* for *Oromys* Rob. and Kl. 1916, preoccupied.

Genus PITHECHEIR F. Cuvier, 1842.

Pithecheir melanurus. Red Tree Rat.

Pithecheir melanurus melanurus Cuv.
Pithecheir melanurus F. Cuvier in E. Geoffroy St. H. and F. Cuvier, Hist. Nat. Mamm., Table gen. 1842, p. 4: Java.
Distr.—Java; Sumatra.

Pithecheir melanurus parvus Kl.[1]
Pithecheirus melanurus parvus Kloss, Journ. Fed. Mal. States Mus. VI, 1906, p. 250: Bukit Kutu, Selangor, 3,400 ft.
Distr.—Malay States.

Genus BANDICOTA Gray, 1873.

Bandicota indica. Bandicoot Rat.

[**Bandicota indica indica (Bech.).**
Mus indica J. M. Bechstein in Pennant, Uebers. 4 füss. Thiere, II, 1800, p. 497 (? p. 714): Pondicherry.
Distr.—Extralimital.]

Bandicota indica setifera (Horsf.).
Mus setifer Horsfield, Zool. Researches Java, 1824, Java.
Distr.—Java; Sumatra.

Genus GUNOMYS Thomas, 1907.

Gunomys bengalensis.[2] Mole Rat.

[**Gunomys bengalensis bengalensis (Gray).**
Arvicola bengalensis J. E. Gray, Ill. Indian Zool. II, 1832–35, pl. 21: Bengal.
Distr.—Extralimital.]

Gunomys bengalensis varius Thos.
Gunomys varius Thomas, Ann. Mag. Nat. Hist. (7), XX, 1907, p. 204: Penang.
Gunomys varillus Thomas, Ann. Mag. Nat. Hist. (7), XX, 1907, p. 205: Penang.
Distr.—Penang Island.

Gunomys bengalensis sundavensis Kl.
Gunomys bengalensis sundavensis Kloss, Treubia, II, 1921, p. 116: Atjeh, North Sumatra.
Distr.—Sumatra; Java.

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[1] *Pithecheir.* The type and only known specimen of *parvus* is in an immature pelage and it has yet to be proved that there are two forms of this rare animal. As, however, it is extremely improbable that Javan and Malayan specimens are inseparable racially I retain the two nominal subspecies.

[2] *Gunomys bengalensis.* *See* Chas., Bull. Raff. Mus. 12, 1936, p. 135.

Family HYSTRICIDÆ.

Genus HYSTRIX Linn. 1758.[1]

Hystrix brachyura.[2] Common Porcupine.

Hystrix brachyura brachyura Linn.

Hystrix brachyura Linn., Syst. Nat. ed. 10, 1758, p. 75: Malacca.

Acanthochoerus grotei Gray, Proc. Zool. Soc. 1866, p. 310: Malacca.

Distr.—Malay Peninsula.

Hystrix brachyura longicauda Marsd.

Hystrix longicauda Marsden, History of Sumatra, 1811, p. 118, and pl. XIII (1810): Sumatra.

Hystrix mülleri Marshall, Proc. Zool. Soc. 1871, p. 235, footnote: Sumatra.

Distr.—Sumatra; Borneo.

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[1] *Hystrix*. *Acanthion* Cuv. is available for the Malaysian forms if separation is desired; and *Thecurus* Lyon (for *crassispinus* and *sumatrae*) for further reduction of the genus.

[2] *H. brachyura* and *crassispinus*. Revision: Lyon, Proc. U.S. Nat. Mus. XXXII, 1907, p. 578.

It seems to me that the skulls of the Sumatran "*Acanthion*" which has been named *longicauda* and of the Bornean animal, to which no name has been given, do not differ from each other. As compared with skulls of the continental animal they are smaller, failing to attain the length by about half an inch: they also show a tendency to develop actually broader nasals. Otherwise, I can perceive no real differences for in Malaysian porcupines there is a great amount of individual variation, not only in the general shape of the skull and its size, but also in its component parts, in the shape and proportions of the nasals, maxillary, zygomatic and malar processes, interpterygoid space, bullae and teeth, which masks any geographical distinctions. The Javanese form (the only porcupine known from Java) differs from both *brachyura* and *longicauda*: it has much smaller tail capsules, and is a still smaller race. The flattened bristles of the shoulders are apparently much more distinctly white-tipped, and on the other hand the white tips to the quills and spines of the rump appear to be shorter. In some respects the external appearance suggests "*Thecurus*".

The most salient difference between the two Malaysian species of *Hystrix* is in the length of the nasal bones: that with short nasals has been given generic rank by Lyon as *Thecurus*. The Sumatran representative of the Bornean *crassispinis* is *Thecurus sumatrae* Lyon. Differences between these two forms have yet to be demonstrated though Miller states that they are distinct (Proc. U.S. Nat. Mus. XL, 1911, p. 113). As far as I can judge from the description Schwarz has recently redescribed *crassispinis*, evidently misled by Lyon's association of it with *Acanthion* and not "*Thecurus*". Externally *crassispinis* very closely resembles *javanica*: it has the same small tail-capsules, but seems to have the white areas of the quills and spines on the posterior part of the back reduced in extent so that the rump appears to be darker.

"*Hystrix fleminqii*" Gray, 1847 is said to be a hybrid.

Hystrix brachyura javanica (F. Cuv.).

Acanthion javanicum F. Cuvier, Mém. Mus. H. N. (Paris), IX, 1823, p. 431: Java.

Hystrix torquata van der Hoeven and de Vriese, Tijdscrift Natuur. geschied. en physiol. III, 1836, p. 110: Java.

Hystrix brevispinosa Wagner, Schreb. Säugth., Suppl. IV, 1843, p. 20: Java.

Distr.—Java.

Hystrix brachyura sumbawæ (Schwarz).

Acanthion sumbawae Schwarz, Ann. Mag. Nat. Hist. (8), VII, 1911, p. 639: Sumbawa Island.

Distr.—Bali.

Hystrix crassispinis. Thick-spined Porcupine.

Hystrix crassispinis crassispinis Günth.

Hystrix crassispinis Günther, Proc. Zool. Soc. 1876, p. 736: Borneo, opposite Labuan Island.

Thecurus major Schwarz, Journ. Mamm. XX, 1939, p. 246: near Samarinda, East Borneo.

Distr.—Borneo.

Hystrix crassispinis sumatræ (Lyon).

Thecurus sumatrae Lyon, Proc. U.S. Nat. Mus. XXXII, 1907, p. 583: Aru Bay, east coast Sumatra.

Distr.—Sumatra.

Genus **ATHERURUS** F. Cuvier, 1829.

Atherurus macrourus.[1] Brush-tailed Porcupine.

Atherurus macrourus macrourus (Linn.).

Hystrix macroura Linn., Syst. Nat. ed. 10, 1758, p. 57: Malacca.

Hystrix fasciculata Shaw, Gen. Zool. II, pt. I, Mamm. 1801, p. 11. pl: Malacca.

Distr.—Malay Peninsula; Sumatra.

Atherurus macrourus tionis Thos.

Atherurus tionis Thomas, Journ. Fed. Malay States Mus. II, 1908, p. 105: Tioman Island.

Distr.—Tioman Island, off east coast Johore, Malay States.

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[1] *Atherurus macrourus.* Revision: Lyon, Proc. U.S. Nat. Mus. XXXII, 1907, p. 584. Although this species occurs in Sumatra, no specimens seem to have been critically examined: I therefore refer them to the typical race, from which it is quite possible that they do not differ.

Atherurus macrourus pemangilis Rob.
Atherurus macrourus pemangilis Robinson, Ann. Mag. Nat. Hist. (8), X, 1912, p. 590: Pemanggil Island.
Distr.—Pemanggil Island, east coast Malay Peninsula.

Atherurus macrourus zygomaticus Mill.
Atherura zygomatica Miller, Smiths. Misc. Coll. XLV, 1903, p. 42: Aor Island.
Distr.—Aor Island, off east coast Johore, Malay States.

Atherurus macrourus terutaus Lyon.
Atherurus terutaus Lyon, Proc. U. S. Nat. Mus. XXXII, 1907, p. 587: Terutau Island.
Distr.—Terutau Island, Straits of Malacca.

Genus **TRICHYS** Günther, 1876.

Trichys lipura.[1] Long-tailed Porcupine.

Trichys lipura Günth.
Trichys lipura Günther, Proc. Zool. Soc. 1876, p. 739: mainland of Borneo, opposite island of Labuan.
Trichys guentheri Thos., Proc. Zool. Soc. 1889, p. 235: *nom. nov.* for *lipura*.
Distr.—Borneo.

Trichys lipura macrotis Mill.
Trichys macrotis Miller, Proc. U. S. Nat. Mus. XXVI, 1903, p. 469: Tapanuli Bay, West Sumatra.
Distr.—Malay States; Sumatra.

Order SIRENIA

Family DUGONGIDÆ.

Genus **DUGONG**, Lacépède, 1799.

Dugong dugon (Müll.). Dugong.
Trichecus dugon P. L. S. Müller in Linn. Syst. Nat., Suppl. (1776), p. 21: Indian Ocean.
Distr.—Malaysian Seas.

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[1] *Trichys.* Revision: Lyon, Proc. U.S. Nat. Mus. XXXII, 1907, p. 589. Specimens from the Malay States are in the Raffles Museum, but no Sumatran material is available for comparison: on description animals from the two localities seem alike.

Order UNGULATA

Family ELEPHANTIDÆ.

Genus ELEPHAS Linn. 1758.

Elephas maximus.[1] Asiatic Elephant.

[*Elephas maximus maximus* Linn., Syst. Nat. ed. 10, 1758, p. 33: Ceylon.

Distr.—Extralimital.]

Elephas maximus indicus Cuv.

Elephas indicus G. Cuvier, Mém. Inst. (Paris), II, 1798, p. 21: India.

Elephas hirsutus Lydekker, Abstr. Proc. Zool. Soc. No. 130, 1914, p. 20: Negri Sembilan, Malay States.

Distr.—Malay Peninsula; Borneo.

Elephas maximus sumatranus Temm.

Elephas sumatranus Temminck, Coup-d'oeil poss. Néerland. II, 1847, p. 91: Sumatra.

Distr.—Sumatra.

Family SUIDÆ.[2]

Genus SUS Linn. 1758.

Sus cristatus. Wild Pig.

[**Sus cristatus cristatus (Wagn.).**

Sus cristatus cristatus Wagner, Münch. Gelehrt. Anz., IX, 1839, p. 535 (misprint for 435): India. *Ref. not seen.*

Distr.—Extralimital.]

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[1] *Elephas maximus.* The view here taken is that *maximus* is based on the indigenous elephant of Ceylon. The type of *hirsutus* is abnormal: it is far more hairy than any of the other young Malayan elephants I have seen. It has not yet been demonstrated that the elephants of Siam and the Malay Peninsula differ from the Indian form. The Sumatran elephant is quite distinct. From the scanty evidence available the Bornean herds, descendants of an introduced stock, seem to resemble the continental form rather than *sumatranus.* Lydekker considers that the tusked elephant of Ceylon is an introduced form, but Mr. P. Deraniyagala who has obtained plenty of chunks of tusks of *E. m. sinhaleyas*, which is very closely allied to the existing race, from the upper Pleistocene deposits of the island, kindly writes to me from the Colombo Museum.—"Lydekker after presuming that no true Ceylon elephant ever possessed tusks goes further and presumes that Linne's description refers to tusks when it might well have been tushes. I see no valid reason for not accepting Linne's very definite statement that Ceylon is the type locality of *Elephas maximus.*"

[2] *Sus.* Revisions: Forsyth Major, Ann. Mag. Nat. Hist. (6), XIX, 1897 (*celebensis-verrucosus* group); Jent., Notes Leyd. Mus. XXVI, 1905; Miller, Proc. U.S. Nat. Mus. XXX, 1906, p. 737 (*cristatus, barbatus* groups).

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Sus cristatus jubatus Mill.
Sus jubatus Miller, Proc. U. S. Nat. Mus. XXX, 1906, p. 745: Trang, Peninsular Siam.
Distr.—Malay Peninsula (part).

Sus cristatus peninsularis Mill.[1]
Sus peninsularis Miller, Proc. U. S. Nat. Mus. XXX, 1906, p. 749: Mt. Pulai, South-West Johore.
Distr.—Malay States (part).

Sus cristatus jubatulus Mill.
Sus jubatulus Miller, Proc. U. S. Nat. Mus. XXX, 1906, p. 746: Terutau Island.
Distr.—Islands of Terutau and Langkawi, Straits of Malacca.

Sus cristatus vittatus Boie.
Sus vittatus H. Boie, Bijdr. Nat. Wetensch. III, (I), 1828, p. 240: Sumatra (*ref. fide Sherborn*).
Distr.—Sumatra.

Sus cristatus rhionis Mill.
Sus rhionis Miller, Proc. U. S. Nat. Mus. XXX, 1906, p. 749: Ungar Island.
Distr.—Islands of Ungar, Sugi Bawa, Chombol and Gt. Karimon, Rhio Archipelago; Lingga Island.

Sus cristatus andersoni Thos. and Wrought.
Sus andersoni Thomas and Wroughton, Ann. Mag. Nat. Hist. (8), III, 1909, p. 441: Batam Island.
Distr.—Islands of Bintang, Batam, Bulan, Galang; and Gt. Karimon (? accidental), Rhio Archipelago.

Sus cristatus milleri Jent.
Sus Milleri Jentink, Notes Leyd. Mus. XXVI, 1905, p. 176: Java.
Distr.—Java.

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[1] *Sus c. peninsularis.* In the south of the Malay Peninsula, including Singapore, *S. cristatus* is unstable. Some specimens are like *vittatus*, but perhaps average a trifle larger; others are diverging towards *jubatus*. Pigs of the latter type are "*peninsularis*" which, therefore, represents only a part of the local pigs. I use the name to cover, coveniently, the nondescript, south Malayan pig, but most specimens from the Malay States are better referred to *jubatus*.

No pig of the *cristatus-vittatus* group has yet been found in Borneo. On a number of Malaysian islands there exist feral pigs (*e.g.* in the Anamba group). An unidentified species of *Sus* is said to occur on Bali, by Sody, "the skulls do not show close relationship to *S. vittatus* nor to *S. verrucosus* of Java." Unidentified wild forms of *cristatus* also occur on the islands of Durian, Bakong, and Sanglar in the Rhio Archipelago: all are probably *rhionis*. From the tiny island of Penjait Layer in the middle of the Rhio group Lyon records a specimen which he regards as indistinguishable from the Sumatran *vittatus* and quite distinct from *rhionis*. In the maze of islands known as the Rhio Archipelago the wild pigs certainly move about and they have been seen crossing from one island to another, sometimes in large numbers. But, according to my belief, the larger islands also have their resident population.

Sus cristatus natunensis Mill.

Sus natunensis Miller, Proc. Wash. Acad. Sci. III, 1901, p. 117: Laut Island.

Distr.—Islands of Laut, Lingung and Bunguran, North Natuna Islands.

* **Sus cristatus mimus Mill.**

Sus mimus Miller, Proc. U. S. Nat. Mus. XXX, 1906, p. 753: Simalur Island.

Distr.—Simalur Island, West Sumatra.

* **Sus cristatus babi Mill.**

Sus babi Miller, Proc. U. S. Nat. Mus. XXX, 1906, p. 752: Babi Island.

Distr.—Babi Island near Simalur, West Sumatra.

* **Sus cristatus tuancus Lyon.**

Sus babi tuancus Lyon, Proc. U. S. Nat. Mus. LII, 1916, p. 453: Tuangku Island.

Distr.—Tuangku Island, Banjak Islands, West Sumatra.

* **Sus cristatus niadensis Mill.**

Sus niadensis Miller, Proc. U. S. Nat. Mus. XXX, 1906, p. 751: Nias Island.

Distr.—Nias Island, West Sumatra.

* **Sus cristatus enganus Lyon.**

Sus babi enganus Lyon, Proc. U. S. Nat. Mus. LII, 1916, p. 454: Engano Island.

Distr.—Engano Island, West Sumatra.

Sus verrucosus Müll. and Schleg.[1] Java Pig.

Sus verrucosus Müller and Schlegel, Verh. Zoogl. Ind. Arch., i, 1842, p. 107, pls. XXVIII and XXXII: Java.

Sus mystaceus Gray, Hand-List Thick-skinned Mamm. Brit. Mus. 1873, p. 62: Java (? hybrid).

Distr.—Java.

Sus barbatus.[2] Bearded Pig.

Sus barbatus barbatus Müll.

Sus barbatus Müller, Tijdsch. nat. geschied. physiol. V (1 and 2) 1838, p. 149: Banjermasin, South Borneo.

Sus longirostris Nehring, Zool. Anz. VIII, 1885, p. 347: Borneo.

Distr.—Borneo.

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[1] *Sus verrucosus.* The skull of a pig said to have been collected in Borneo by Wallace was described as *Sus verrucosus borneensis* Major, Ann. Mag. Nat. Hist. (6), XIX, 1897, p. 534, but I do not believe in the existence of any pig of the *celebensis-verrucosus* group in Borneo, and suspect a mistake in labelling.

[2] *Sus barbatus.* *See* Kloss, Journ. Strs. Br. Roy. Asiat. Soc. No. 83, 1921, p. 147; and Bull. Raffles Mus. 5, 1931, p. 103. Remains of *Sus barbatus* have recently been found in cave deposits associated with neolithic man in the Malay States and there is therefore now no need to assume an extralimital origin for the few much discussed Malayan specimens recently shot in Pahang and Johore.

Sus barbatus oi Mill.

Sus oi Miller, Proc. Biol. Soc. Wash. XV, 1902, p. 51: Indragiri, East Sumatra.

Sus barbatus edmondi Sody, Temminckia, II, 1937, p. 212: Lampongs, South Sumatra.

Distr.—Sumatra; Banka; islands of Batam, Bintang, Galang, Sauh, Durian, Kundur and Ungar, Rhio Archipelago; Malay Peninsula.

* **Sus gargantua** Mill.[1] Giant Pig.

Sus gargantua Miller; Proc. U. S. Nat. Mus. XXX, 1906, p. 743: South-East Borneo.

Distr.—South-East Borneo.

Family TRAGULIDÆ.[2]

Genus TRAGULUS.[3] Pallas, 1779.

Tragulus javanicus.[4] Larger Mouse-deer; Napu.

Tragulus javanicus javanicus (Osb.).

Cervus javanicus P. Osbeck, Reise Ost.-Ind. China, 1765, p. 367: Java.

Tragulus fuscatus Blyth, Journ. Asiat. Soc. Beng. XXVII, 1858, p. 278: Java (*Sclater, 1891*).

Distr.—Java.

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[1] *Sus gargantua.* The name *Sus branti* Kloss, is an inadvertent application of a name to a large pig, thought to be the Sumatran representative of *Sus gargantua*, but it has, of course, no status in nomenclature. I find it difficult to believe that two species of large pigs, so much alike, occur side by side in Borneo, and with Tucker (Proc. Zool. Soc. 1931, p. 491) I incline to the notion that "*gargantua*" is an aberration of *barbatus*.

[2] *Tragulus annae* Matschie, Sitzber. Gesellsch. naturforsch. Freunde zu Berlin, 1897, p. 157 (typical locality unknown) is, perhaps, a Malaysian form.

[3] *Tragulus.* Partial revision: Kloss, Journ. Fed. Malay States Mus. VII, 1918, p. 245.

[4] *Tragulus javanicus.* I am not yet entirely convinced that specimens from Peninsular Siam, and others from the southern part of the Malay States should be referred to one subspecies. There is, perhaps, a northern race which is paler on the back and never quite so blackened as most skins from the Malay States, but the available northern series is small, and the distinction is very fine. Miller has described two forms of *Tragulus* from Mansalar Island: I have no material from the island, and perhaps both the Malaysian species of the genus are represented, but as *amoenus* and *jugularis* are said to be more or less alike in size, it also seems likely that they represent two phases of one race of one species. There can, I think, be no doubt that the type of *stanleyanus* came from Batam Island in the Rhio Archipelago, and within sight of Singapore.

In my list I have transferred to *javanicus* some forms originally described as races of *kanchil*. Typically, or where they occur together, the two species can be recognised by a number of characters, but isolated forms occurring alone on small islands have presented much difficulty in the past, for in some cases they seemed to combine characters of the two

TRAGULIDÆ

Tragulus javanicus napu (Cuv.).

Moschus napu F. Cuvier, in E. Geoffroy St. H. and F. Cuv., Hist. Nat. Mamm. II, 37, 1822, Chev. napu, p. 4: Sumatra (*restr.* South Sumatra, *Sody*, 1931).

Tragulus canescens Mill., Proc. Biol. Soc. Wash. XIII, 1900, p. 185: Trang, Peninsular Siam.

Tragulus javanicus neubronneri Sody, Natuur. Tjids. Ned. Ind., XCI, 1931, p. 355: Peureula, East Atjeh, North Sumatra.

Distr.—Singapore Island; Malay Peninsula; Sumatra.

* **Tragulus javanicus niasis** Lyon.

Tragulus napu niasis Lyon, Proc. U. S. Nat. Mus. LII, 1916, p. 455: Nias Island.

Distr.—Nias Island, West Sumatra.

* **Tragulus javanicus batuanus** Mill.

Tragulus batuanus Miller, Smiths. Misc. Coll. XLV, 1903, p. 2: Tana Bala Island, Batu Islands.

Distr.—Islands of Tana Bala and Tana Masa, Batu Islands, West Sumatra.

* **Tragulus javanicus amœnus** Mill.

Tragulus amoenus Miller, Proc. U. S. Nat. Mus. XXVI, 1903, p. 439: Mansalar Island.

? *Tragulus jugularis* Mill., Proc. U.S. Nat. Mus. XXVI, 1903, p. 440: Mansalar Island.

Distr.—Mansalar Island, West Sumatra.

Tragulus javanicus umbrinus Mill.

Tragulus umbrinus Miller, Proc. Biol. Soc. Wash. XIII, 1900, p. 191: Langkawi Island.

Distr.—Langkawi Island, Straits of Malacca.

Tragulus javanicus terutus Thos. and Wrought.

Tragulus canescens terutus Thomas and Wroughton, Ann. Mag. Nat. Hist. (8), IV, 1909, p. 536: Terutau Island.

Distr.—Terutau Island, Straits of Malacca.

Tragulus javanicus bancanus Lyon.

Tragulus bancanus Lyon, Proc. U. S. Nat. Mus. XXXI, 1906, p. 576: Banka Island.

Distr.—Banka Island.

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species. I now find that the two species, however altered, can always be recognized by the larger "feet" (lengthened toes and shortened metatarsus) of *javanicus*, which is more addicted to swamp country than *kanchil*. The mouse-deer of the Anamba Islands present such a case. I now believe them to be small forms of *javanicus*. They are very richly coloured like *rufulus* and *stanleyanus*, but there is usually an indication of a nape stripe: the under parts are much brighter than in the related forms, and to a greater or lesser extent, orange-buff in colour.

T. abruptus also has the large feet of the "napu", and in spite of its small size I now believe it to be a race of *javanicus* separable from *abjectus* by reason of its smaller size, darker longitudinal throat stripes, and the presence of a well developed, dark, median, ventral area. For the moment I accept the convention of recognizing two species of *Tragulus* in Java, but I rather doubt if "*javanicus*" really occurs there.

Tragulus javanicus billitonus Lyon.
Tragulus billitonus Lyon, Proc. U. S. Nat. Mus. XXXI, 1906, p. 578: Billiton Island.
Distr.—Billiton Island.

Tragulus javanicus borneanus Mill.
Tragulus borneanus Miller, Proc. Biol. Soc. Wash. XV, 1902, p. 174: British North Borneo.
Distr.—Borneo; Laut Island, South-East Borneo.

Tragulus javanicus banguei Chas. and Kl.
Tragulus javanicus banguei Chasen and Kloss, Bull. Raffles Mus. 6, 1931, p. 16: Banguey Island.
Distr.—Banguey Island, British North Borneo.

*** Tragulus javanicus sebucus Lyon.**
Tragulus sebucus Lyon, Proc. U. S. Nat. Mus. XL., 1911, p. 64: Sebuko Island.
Distr.—Sebuko Island, South-East Borneo.

Tragulus javanicus abjectus Chas.
Tragulus javanicus abjectus Chasen, Bull. Raffles Mus. 10, 1935, p. 11: Sirhassen Island.
Distr.—Sirhassen Island, South Natuna Islands.

Tragulus javanicus abruptus Chas.
Tragulus kanchil abruptus Chasen, Bull. Raffles Mus. 10, 1935, p. 12: Subi Island.
Distr.—Subi Island, South Natuna Islands.

Tragulus javanicus rufulus Mill.
Tragulus rufulus Miller, Proc. Wash. Acad. Sci. II., 1900, p. 227: Tioman Island.
Distr.—Tioman Island, off Pahang, east coast Malay Peninsula.

Tragulus javanicus stanleyanus (Gray).
Moschus stanleyanus Gray, Proc. Zool. Soc. 1836, p. 65: no loc. *subst.* Batam Island.
Tragulus perflavus Mill., Proc. U.S. Nat. Mus. XXXVI, 1907, p. 251: Batam Island.
Distr.—Islands of Batam, Galang, Setoko and Bulan, Rhio Archipelago.

Tragulus javanicus formosus Mill.
Tragulus formosus Miller, Proc. Biol. Soc. Wash. XVI, 1903, p. 34: Bintang Island.
Distr.—Bintang Island, Rhio Archipelago.

Tragulus javanicus lutescens Mill.
Tragulus lutescens Miller, Proc. Biol. Soc. Wash. XVI, 1903, p. 32: Sugi Bawa Island.
Distr.—Islands of Sugi Bawa and Jan, Rhio Archipelago.

Tragulus javanicus flavicollis Mill.
Tragulus flavicollis Miller, Proc. Biol. Soc. Wash. XVI, 1903, p. 33: Sugi Island.
Distr.—Sugi Island, Rhio Archipelago.

Tragulus javanicus nigrocinctus Mill.
Tragulus nigrocinctus Miller, Proc. U. S. Nat. Mus. XXXI, 1906, p. 250: Kundur Island.
Distr.—Islands of Great Karimon and Kundur Island, Rhio Archipelago.

Tragulus javanicus pretiosus Mill.
Tragulus pretiosus Miller, Proc. Acad. Nat. Sci. Philad. 1902, p. 144: Lingga Island.
Distr.—Lingga Island, Lingga Archipelago.

Tragulus javanicus pretiellus Mill.
Tragulus pretiellus Miller, Proc. U. S. Nat. Mus. XXXI, 1906, p. 253: Bakong Island.
Distr.—Bakong Island, Lingga Archipelago.

Tragulus javanicus parallelus Mill.
Tragulus pretiellus parallelus Miller, Proc. Biol. Soc. Wash. XXIV, 1911, p. 165: Sebang Island.
Distr.—Sebang Island, Lingga Archipelago.

Tragulus javanicus nigricollis Mill.
Tragulus nigricollis Miller, Proc. Acad. Nat. Sci. Philad. 1902, p. 145: Singkep Island.
Distr.—Singkep Island, Lingga Archipelago.

Tragulus javanicus anambensis Chas. and Kl.
Tragulus kanchil anambensis Chasen and Kloss, Journ. Mal. Br. Roy. Asiat. Soc. VI, pt. 3, 1928, p. 32: Mata Island.
Distr.—Mata Island, Anamba Islands.

Tragulus javanicus siantanicus Chas. and Kl.
Tragulus kanchil siantanicus Chasen and Kloss, Journ. Malay Br. Roy. Asiat. Soc. VI, pt. 3, 1928, p. 31: Siantan Island.
Distr.—Siantan Island, Anamba Islands.

Tragulus javanicus hendersoni Chas.[1]
Tragulus javanicus hendersoni Chasen, Bull. Raffles Mus. 15, 1940, p. 196: Jimaja Island.
Distr.—Jimaja Island, Anamba Islands.

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[1] **Tragulus javanicus hendersoni** subsp. nov.

Nearest to *siantanicus*, but the upper parts less tinged with rufous, and rather more blackened, the former character being especially noticeable on the flanks which are almost as grey as in the mainland and large island forms of *javanicus* (*napu*, *borneanus* etc.). Excepting the lower abdomen which is white, the breast and abdomen are buff, washed with dull brown on the middle line, and are entirely without the bright orange-buff areas so marked in the other forms from the Anamba Islands.

Type.—The skin and skull of an immature female with incomplete dentition, collected on Jimaja Island, Anamba Islands, in April, 1928, by M. R. Henderson. Raffles Mus. No. 422.

Tragulus javanicus bunguranensis Mill.

Tragulus bunguranensis Miller, Proc. Wash. Acad. Sci. III, 1901, p. 113: Bunguran Island.

Distr.—Bunguran Island, North Natuna Islands.

Tragulus kanchil.[1] Smaller Mouse-deer; Pelandok.

Tragulus kanchil kanchil (Raffles).

Moschus javanicus Gmel., Syst. Nat. Ed. XIII, I, 1788, p. 174: not *Cervus javanicus* Osb. 1765.

Moschus kanchil T. S. Raffles, Trans. Linn. Soc. XIII, 1821, p. 262: Sumatra.

Moschus pelandoc C. H. Smith in Griffith's Cuvier, Anim. Kingd., Mamm., Syn. 1827, p. 302: no loc. *subst.* Sumatra.

Distr.—Sumatra (part).

Tragulus kanchil longipes Lyon.

Tragulus kanchil longipes Lyon, Proc. U. S. Nat. Mus. XXXIV, 1908, p. 628: Little Siak River, East Sumatra.

Distr.—Sumatra (part); Panjalei Island, East Sumatra.

Tragulus kanchil fulvicollis Lyon.

Tragulus fulvicollis Lyon, Proc. U. S. Nat. Mus. XXXIV, 1908, p. 630: Bengkalis Island.

Distr.—Islands of Bengkalis, Padang, Rupat, Tebing Tinggi and Rangsam, East Sumatra.

Tragulus kanchil angustiae Kl.

Tragulus kanchil angustiae Kloss, Journ. Fed. Mal. States Mus. VII, 1918, p. 254: Victoria Point, Tenasserim.

Distr.—Peninsular Siam (extreme north).

Measurements.—Head and body, 520; tail, 80; hind-foot with hoof, 135; ear, 36 mm.

Skull.—Condylo-basilar length, 74·9; zygomatic breadth, 43·4; least interorbital width, 25·6 mm. (only four cheek teeth showing).

Remarks.—This form, of which only the type has been examined, provides a link between the other two forms known from the Anamba Islands (*siantanicus* and *anambensis*), and those of the islands of Tioman (*rufulus*) and Batam (*stanleyanus*). On the under parts it is much like *rufulus* and *stanleyanus*, but it is less reddish on the upper parts than the former, and less brightly yellowish than the latter subspecies.

[1] *Tragulus kanchil.* Partial revision: Kloss, Journ. Fed. Mal. States Mus. VII, 1918, p. 250. In this paper the allocation of *fulviventer* seems sound, but the range attributed to the form is too great, and other subspecies are described below. The Langkawi race can be maintained on the high average size of the skull. In the Malay Peninsula specimens of *fulviventer* from Johore average very slightly darker on the throat stripes than do others from the more northern Malay States, but the difference is very slight.

Tragulus kanchil ravus Mill.
Tragulus ravus Miller, Proc. Biol. Soc. Wash. XV, 1902, p. 163: Trang, Peninsular, Siam.
Distr.—Malay Peninsula (north); Lontar Island, west coast Peninsular Siam.

Tragulus kanchil fulviventer Gray.
Tragulus fulviventer J. E. Gray, Proc. Zool. Soc. 1836, p. 15: Singapore Island (Kloss, 1918).
Distr.—Malay States (part).

Tragulus kanchil insularis Chas.[1]
Tragulus kanchil insularis Chasen, Bull. Raffles Mus. 15, 1940, p. 198: Junk Seylon.
Distr.—Islands of Junk Seylon, Sireh and Panjang, west coast Peninsular Siam.

Tragulus kanchil pidonis Chas.[2]
Tragulus kanchil pidonis Chasen, Bull. Raffles Mus. 15, 1940, p. 198: Koh Pipidon.
Distr.—Koh (Island) Pipidon, west coast Peninsular Siam.

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[1] **Tragulus kanchil insularis** subsp. nov.

In general colour intermediate between *T. k. ravus* of the opposite mainland, and the more southern *fulviventer*, but with the nape stripe obsolete and less conspicuous than in either of these two races. Compared with *ravus*, *insularis* has the upper parts and throat stripes rather darker, and the under parts more richly coloured.

Type.—Adult male, skin and skull, collected on Junk Seylon Island, west coast Peninsular Siam, on 21st December, 1917, by a museum collector. No. 6543.

Measurements.—Head and body, 410; tail, 65; hind-foot, with hoof, 107; ear, 35 mm.

Skull.—Condylo-basilar length, 72; greatest breadth, 42·9; least interorbital breadth, 25·6; upper molar row, alveoli, 35; lower cheek teeth, 39·5 mm.

Remarks.—Six specimens of *insularis* from the islands of Junk Seylon, Sireh and Panjang are separable at sight from any mainland race. Specimens from the coastal island of Lontar are better referred to *ravus* than to *insularis*.

[2] **Tragulus kanchil pidonis** subsp. nov.

A pale form, very close to *T. k. ravulus* of the Butang Archipelago, but the limbs even paler than in that form: the toes covered with whitish, not buff hairs; the shanks of the forelimbs paler and less tawny-yellow; and the shanks of the hind limbs, covered with whitish buff, not rufous-buff hairs.

Type.—Adult male, skin and skull, collected on Koh (Island) Pipidon, west coast Peninsular Siam, on 4th February, 1919, by H. C. Robinson and C. Boden Kloss. No. 8160.

Tragulus kanchil ravulus Mill.
Tragulus ravulus Miller, Proc. Biol. Soc. Wash. XVI, 1903, p. 41: Adang Island.
Distr.—Islands of Adang and Rawi, Butang Islands, Straits of Malacca.

Tragulus kanchil lancavensis Mill.
Tragulus lancavensis Miller, Proc. Biol. Soc. Wash. XVI, 1903, p. 41: Langkawi Island.
Distr.—Langkawi Island, Straits of Malacca.

Tragulus kanchil penangensis Kl.
Tragulus kanchil penangensis Kloss, Journ. Fed. Malay States Mus. VII, 1918, p. 253: Penang Island.
Distr.—Penang Island, Straits of Malacca.

Tragulus kanchil pumilus Chas.[1]
Tragulus kanchil pumilus Chasen, Bull. Raffles Mus. 15, 1940, p. 199: Great Redang Island.
Distr.—Great Redang Island, off Trengganu, east coast Malay Peninsula.

Measurements.—Head and body, 421; tail, 69: hind-foot, 117; ear, 37 mm.

Skull.—Greatest length, 94·6; condylo-basilar length, 73·9; greatest breadth, 43·7; least interorbital breadth, 25·5; upper molar row, alveoli, 33·1; lower cheek teeth 36·4 mm.

Remarks.—It was to be expected that a *Tragulus* form occurring on the relatively remote and tiny island of Pipidon would show some degree of divergence from its neighbours. This is not a well marked subspecies. Three specimens have been examined and compared with five examples of *ravulus:* one of the latter is intermediate in appearance between the two forms, but it still remains not quite like any skin of *pidonis.*

[1] **Tragulus kanchil pumilus** subsp. nov.

Like T. k. fulviventer of the opposite mainland, but smaller.

Type.—Adult male, skin and skull, collected on Gt. Redang Island, off Trengganu, east coast Malay Peninsula, on 3rd September, 1910, by C. Boden Kloss. No. 2327/10.

Measurements.—Head and body, 405; tail, 65; hind-foot with hoof, 105; ear, 32 mm.

Skull.—Greatest length, 88; basal length, 76; condylo-basilar length, 68·4; greatest breadth, 40; least interorbital breadth, 25·6; upper molar row, alveoli, 32·5; mandibular cheek teeth, 36·4 mm.

Remarks.—Although I have only one specimen from Great Redang Island, it is, fortunately, fully adult with complete dentition. I cannot match it from a large series of *fulviventer,* and have no doubt that it is representative of a dwarfed island race.

Tragulus kanchil luteicollis Lyon.
Tragulus luteicollis Lyon, Proc. U. S. Nat. Mus. XXXI, 1906, p. 579: Banka Island.
Distr.—Banka Island.

Tragulus kanchil rubeus Mill.
Tragulus rubeus Miller, Proc. Biol. Soc. Wash. XVI, 1903, p. 40: Bintang Island.
Distr.—Bintang Island, Rhio Archipelago; (? Batam and Karimon Islands, *subsp. incert.*).

Tragulus kanchil subrufus Mill.
Tragulus subrufus Miller, Proc. Biol. Soc. Wash. XVI, 1893, p. 39: Sinkep Island.
Distr.—Islands of Sinkep, Penuba and Lingga, Lingga Archipelago.

* **Tragulus kanchil brevipes Mill.**
Tragulus brevipes Miller, Proc. U. S. Nat. Mus. XXVI, 1903, p. 443: Bangkaru Island.
Distr.—Bangkaru Island, Banjak Islands, West Sumatra.

* **Tragulus kanchil russeus Mill.**
Tragulus russeus Miller, Proc. U. S. Nat. Mus. XVI, 1903, p. 444: Tuangku Island.
Distr.—Tuangku Island, Banjak Islands, West Sumatra.

* **Tragulus kanchil russulus Mill.**
Tragulus russulus Miller, Smiths. Misc. Coll. XLV, 1903, p. 3: Tana Bala Island.
Distr.—Tana Bala Island, Batu Islands, West Sumatra.

* **Tragulus kanchil masae Lyon.**
Tragulus russulus masae Lyon, Proc. U. S. Nat. Mus. LII, 1916, p. 456: Tana Masa Island.
Distr.—Tana Masa Island, Batu Islands, West Sumatra.

* **Tragulus kanchil pinius Lyon.**
Tragulus pinius Lyon, Proc. U. S. Nat. Mus. LII, 1916, p. 455: Finie Island.
Distr.—Pinie Island, Batu Islands, West Sumatra.

Tragulus kanchil hosei Bonh.
Tragulus kanchil hosei Bonhote, Ann. Mag. Nat. Hist. (7), XI, March, 1903, p. 293: Baram, Sarawak.
Tragulus virgicollis Mill., Proc. Biol. Soc. Wash. XVI, March, 1903, p. 37: Mt. Dulit, Sarawak.
Distr.—Borneo (part).

Tragulus kanchil klossi Chas.
Tragulus kanchil klossi Chasen, Bull. Raffles Mus. 9, 1934, p. 98: near Sandakan, British North Borneo.
Distr.—Borneo (part).

Tragulus kanchil pallidus Mill.
Tragulus pallidus Miller, Proc. Wash. Acad. Sci. III, 1901, p. 116: Laut Island.
Distr.—Laut Island, North Natuna Islands.

Tragulus kanchil everetti Bonh.

Tragulus kanchil everetti Bonhote, Ann. Mag. Nat. Hist. (7), XI, March, 1903, p. 295: Bunguran Island.

Tragulus natunae Mill. Proc. Biol. Soc. Wash. XVI, 1903, p. 38: Bunguran Island.

Distr.—Bunguran Island, North Natuna Islands.

Tragulus kanchil carimatæ Mill.

Tragulus carimatae Miller, Proc. U. S. Nat. Mus. XXXI, 1906, p. 55: Karimata Island.

Distr.—Islands of Karimata and Penebangan, West Borneo.

Tragulus kanchil focalinus Mill.[1]

Tragulus focalinus Miller, Proc. Biol. Soc. Wash. XVI, 1905, p. 35: Buitenzorg, West Java.

Distr.—Java.

Family CERVIDÆ.

Cervus unicolor.[2] Sambar; Rusa.

[**Cervus unicolor unicolor Kerr.**

Cervus axis unicolor Kerr, Linn. Anim. Kingd. 1792, p. 306: Ceylon. *Ref. not seen.*

Distr.—Extralimital.]

Cervus unicolor equinus Cuv.

Cervus equinus G. Cuvier, Oss. Foss., ed. 2, IV, 1823, p. 45: Sumatra.

Cervus malaccensis F. Cuv., Hist. Nat. Mamm. i, 1824, pl. X, Malacca. *Ref. not seen.*

Distr.—Malay Peninsula; East Sumatran islands of Bengkalis and Rangsam; Sumatra.

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[1] *Tragulus k. focalinus.*—The "Moschus Pelandoc" of Smith (1827) is based on the pelandok of Raffles (1821), and it is quite clear to a reader with local and Malay knowledge that Raffles' remarks on mouse deer are, in the reference cited, applicable to Sumatra, and not to Java.

[2] *Cervus unicolor.* Natives in various parts of Malaysia will often assert, and apparently with good reason, that the local *rusa* are the descendants of imported herds, and in some cases I know this to be true. The stock in Singapore Island has been replenished several times. I do not believe in the existence of any indigenous form of "*timorensis*" in Sumatra. Lydekker used the name *tunjuc* Vig. and Horsf. for the Javan deer, but this name is based on the vernacular "rusa tunjuk" of Raffles. The name is probably applicable to the barking deer, *Muntiacus m. moschatus*, but in any case Raffles said that no specimens had been obtained and therefore those mentioned by Lydekker, Cat. Ung. IV, p. 69) can scarcely be regarded as the types although they may be the specimens mentioned by Vig. and Horsf. Alternatively, if they are accepted as the types of *C. tunjuc* then that is a *nomen nudum.*

C. u. brookei is rather smaller, and averages a trifle darker than *equinus*, and occasionally the hind tine is as long as, or even slightly longer, than the front tine. In Sarawak there appears to be an introduced stock as well as the indigenous race. A very dark form is said to occur in the inland forests, but I have never seen an adult from such a locality. If a second race can be recognized in Borneo, the name *brookei* applies to the dark forest form. Typically, *russa* is much smaller in build and paler in colour than *equinus*. In the latter form the old pelage is much lighter

Cervus unicolor brookei Hose.

Cervus Brookei Hose, Ann. Mag. Nat. Hist. (6), XII, 1893, p. 206: Mt. Dulit, Sarawak.

Distr.—Borneo; Laut Island, South-East Borneo; North Bornean Islands of Banguey and Balambangan; Billiton; Banka.

Cervus unicolor oceanus Chas. and Kl.

Cervus unicolor oceanus Chasen and Kloss, Proc. Zool. Soc. 1927, p. 818: Siberut Island.

Distr.—Siberut, Sipora and Pagi Islands, West Sumatra; ? Nias Island (*subsp. incert.*).

Cervus unicolor russa Müll. and Schleg.

Cervus russa Müller and Schlegel, in Temm., Verh. nat. ges. Ned. overz. bezitt., Zool. (Mamm.), 1845, p. 217: Java.

Cervus hippelaphus G. Cuv., Oss. Foss. ed. 2. IV, 1823, p. 40, pl. V, figs. 31–34: Java. Not *C. hippelaphus* Exl. 1777.

Distr.—Java.

*** Cervus unicolor renschi Sody.**

Cervus hippelaphus renschi Sody, Natuur. Tijdschr. Ned. Ind. XCII, 1932, p. 335: Sendang, West Bali.

Distr.—Bali.

Cervus kuhlii Müll. and Schleg.[1] Bawean Deer.

Cervus kuhlii Müller and Schlegel, in Temm., Verh. nat. ges. Ned. overz. bezitt., Zool. (Mamm.), 1845, p. 223: Bawean Island.

Distr.—Bawean Island, Java Sea.

Genus MUNTIACUS Rafinesque, 1815.

Muntiacus muntjak.[2] Barking Deer.

Muntiacus muntjak muntjak (Zimm.).

Cervus muntjak E. A. W. Zimmermann, Geogr. Gesch. II, 1780, p. 131: Java.

? *Cervus subcornutus* de Blainville, Bull. Sci. Soc. Philom. Paris, 1816, p. 77: *non vid.*

Distr.—Java; Kangean Island.

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than the fresh coat: old bucks are very much darker than does, and really old males in fresh coat are very dark on the head and neck, becoming almost black on the forehead, with bright tawny rings round the eyes and buttock patches of the same colour.

[1] *Cervus kuhlii.* I am insufficiently acquainted with this small species to discuss its affinities.

[2] *Muntiacus.* I have never handled a specimen of "*Muntiacus pleiharicus*", and know it only from the published descriptions and illustrations. It seems to me to be a form of very doubtful validity, and it is difficult to believe that two *species* of the genus exist side by side in Borneo. Skins from Sarawak are brighter in colour than two flat skins from British North Borneo: by analogy the latter are more likely to be *rubidus*, of which I have no topotypes, than the Sarawak specimens. In the Malay Peninsula, *peninsulae* ranges into Siamese territory, but no specimens are available from the north of Peninsular Siam, where the species is almost certainly changing into one of the paler northern forms.

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* **Muntiacus muntjak nainggolani** Sody.

Muntiacus muntjak nainggolani Sody, Natuur. Tijdschr. Ned. Ind. XCII, 1932, p. 337: Sendang, West Bali.

Distr.—Bali.

Muntiacus muntjak moschatus (Blainv.).

Cervus moschatus de Blainville, Bull. Sci. Soc. Philom. Paris, 1816, p. 77: Bencoolen, West Sumatra.

Distr.—Sumatra (part) ; Nias Island; ? Lingga Island (*subsp. incert.*).

Muntiacus muntjak montanus Rob. and Kl.

Muntiacus muntjak montanus Robinson and Kloss, Journ. Fed. Malay States Mus. VIII, pt. 2, 1918, p. 69: Korinchi Peak, Sumatra, 7,300 ft.

Distr.—Sumatra (part).

Muntiacus muntjak peninsulæ Lyd.

Muntiacus muntjak peninsulae Lydekker, Cat. Ungulate Mamm. IV, 1915, p. 18: Pangkor Island, off Perak, Malay States.

Distr.—Malay Peninsula; Pangkor Island, Straits of Malacca; Singapore Island.

Muntiacus muntjak robinsoni Lyd.

Muntiacus muntjak robinsoni Lydekker, Cat. Ungulate Mamm. IV, 1915, p. 18: Bintang Island.

Distr.—Bintang Island, Rhio Archipelago.

Muntiacus muntjak bancanus Lyon.

Muntiacus bancanus Lyon, Proc. U. S. Nat. Mus. XXXI, 1906, p. 582: Banka Island.

Distr.—Banka and Billiton Islands.

Muntiacus muntjak rubidus Lyon.

Muntiacus rubidus Lyon, Proc. U. S. Nat. Mus. XL, 1911, p. 73: Pamukang Bay, South-East Borneo.

Distr.—Borneo.

***Muntiacus pleiharicus** (Kohl.).

Cervulus pleiharicus Kohlbrugge, Natuurk. Tijdschr. Neth. Ind. LV, pt. 2, 1895, p. 192: Pleihari, South-East Borneo.

Distr.—Borneo.

Family BOVIDÆ.

Genus BOS Linn. 1758.

Bos gaurus.

Gaur.

[**Bos gaurus gaurus** Smith.
Bos gaurus C. H. Smith, In Griffith's Cuvier, Anim. Kingd., Mamm. IV, 1827, p. 399: India.
Distr.—Extralimital.]

Bos gaurus hubbacki Lyd.[1]

Sĕladang.

Bos gaurus hubbacki Lydekker, Game Animals of India etc. 1907, p. 64: Pahang.
Distr.—Malay Peninsula.

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[1] *Bos gaurus hubbacki* is found on both sides of the Malay Peninsula as far south as Johore: it has been recorded from Penang, but there is no reliable evidence that it ever occurred on this, or any other of the coastal islands. The species occurs in Peninsular Siam, but I am unaware of the northern limit of *hubbacki*, or the southern limit of the Burmese race, *readi*. In the Malay States the herds are now so few and small that the sĕladang must be perilously near the extinction decline: absolute protection and undisturbed conditions are essential if it is to survive. But perhaps it is already too late for the species has disappeared from many districts where it was once found, especially in the west coast states where the country has been much opened for agricultural and other purposes. The native state of Pahang is now the stronghold of the sĕladang.

Although very variable in all the characters which have been put forward as of racial value, a Malayan race of the gaur can be maintained as distinct from the typical form on average differences. It would, of course, be remarkable if it did not differ. In *hubbacki* there is much individual variation in the intercornual ridge, but I have never seen a Malayan skull showing the extreme development of the conspicuously recurved ridge often, but not invariably, seen in Indian skulls. In the skull, therefore, the difference is one of degree only. Alleged differences between *gaurus* and *hubbacki* in the colour of the horns, and the extent of the pale area on the forehead, are not confirmed by the material I have seen; and the presence or absence of a whitish band on the snout is a most unreliable character in this species: in mounted heads it is often inconspicuous, or painted out. In the colour of the "stockings" there is certainly no differential character to be found, and T. R. Hubback has recently demonstrated the variability of the size of the dewlap in the Malayan race. This author has also put forward the suggestion that there are two "subspecies" of sĕladang in the Malay States, but his forms exist side by side, their characters intergrade and are not constant, and the variation observed must therefore be individual. Judging by the scanty published records and other available evidence there is a suggestion that *hubbacki* averages smaller than *gaurus*, and although old bulls of the latter are said sometimes to be black, the small series of masks and skins that I have seen at intervals of time induces a belief that, when animals of similar age and sex are compared, *hubbacki* is, perhaps, the darker subspecies. But that *hubbacki* actually is a smaller and darker race than *gaurus* needs confirmation by direct comparison of far more material than yet exists in any one place.

Bos sondaicus.[1]

Bos sondaicus sondaicus Schleg. and Müll. Banteng.

Bos sondaicus Schlegel and Müller in Temminck, Verh. nat. ges. Ned. overz. bezitt., Zool. (Mamm.) 1845, p. 197: Java.

Distr.—Java.

Bos sondaicus lowi Lyd. Temadau.

Bos sondaicus lowi Lydekker, Proc. Zool. Soc. 1912, p. 902: Sarawak.

Distr.—Borneo.

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[1] *Bos sondaicus.* The old authors used this name, but latterly it has been dropped in favour of *banteng* Raffles. This name, however, is vernacular and there is no suggestion of a technical naming in the reference (Hist. of Java, I, 1817, p. 111). Whether or not *banteng* can be maintained on the strength of *Bos banteng* Wagner in Schreber, 1844, I cannot say as the book is not in Singapore: the reference is variously quoted by other authors, but not at all by Sherborn.

Bos leucoprymnus Quoy and Gaimard, Voy. Astrolabe, Zool. I, 1830, p. 140 (Java), seems to have been based on a hybrid.

There is, as far as information at my disposal goes, no evidence for supposing that the typical banteng occurs in a truly wild state anywhere except on the main island of Java. In appearance the domesticated Bali breed is very close indeed to the wild stock, but it is a trifle heavier in build: the wild banteng is very lightly built: the cows especially are very graceful, and almost deer-like.

In colour the Bornean and Javan races are very much alike. It is just possible that old cows of *lowi* are darker than those of *banteng*, but the difference is not great, and the suggestion needs confirmation by more material. The two races are, however, quite distinct on account of their differently shaped horns. Hose's description in his "Mammals of Borneo" is copied word for word from Blanford, and for an original account of the Bornean race see Banks, Journ. Mal. Br. Roy. Asiat. Soc. IX, pt. II, 1936, p. 33, and Lyon (1911).

According to Abbott, the temadau is also found on Laut Island, South-East Borneo, and also on the neighbouring islet of Bira Birahan. On Laut it may be truly wild, for it is common on the opposite mainland.

A Siamese race has been separated as *porteri* Lyd., but it seems not to differ from *birmanicus* (*see* Gairdner, Journ. Nat. Hist. Soc. Siam. II, 1917, p. 250, and Kloss, tom. cit. p. 316). The species is well known to exist in Central Peninsular Siam, and it is reported from the hills between Sentul and Perlis. Kloss thought that the southern limit was about 6° 50′ N., but Hubback now thinks that the species occurs in Perlis and perhaps even as far south as the Telian Valley in Kedah. I cannot confirm that a pair of horns in the Raffles Museum, said to be from Kedah, are correctly localized. Several authors have made reference to a banteng-like animal inhabiting the Malay States and, in an informal manner, Lydekker actually applied the name *Bos sondaicus butleri* to the skull of a cow shot in Perak ("The Field" newspaper, CV, 1905, p. 151). But in view of the large number of trophies that have now been examined it is very hard to believe that any race of the wild banteng now exists in the Malay States, and I believe that the reports and material attributed to it belong to the sĕladang, or to domestic cattle.

Bos sondaicus birmanicus Lyd. Banteng; Tsaine.
Bos sondaicus birmanicus Lydekker, Proc. Zool. Soc. 1898, p. 277: Burma.
Distr.—Peninsular Siam.

Bos bubalis.[1] Indian, or Water Buffalo.

Bos bubalis bubalis Linn.
Bos bubalis Linn., Syst. Nat. ed. 10, 1758, p. 72: "Asia, *cultus in* Italia."
Distr.—Extralimital.]

Bos bubalis hosei Lyd.
Bos bubalis hosei Lydekker, Wild Oxen, Sheep, and Goats, 1898, p. 126: Sarawak.
Distr.—Borneo.

Genus CAPRICORNIS Ogilby, 1837.[2]

Capricornis sumatraensis.[2] Serow.

Capricornis sumatraensis sumatraensis (Bech.).
Antilope sumatraensis J. M. Bechstein, in Pennant, Uebers. 4 fuss. Thiere, I, 1799, p. 98: Sumatra.
Antilope interscapularis Licht., Berl. Mag. VI, 1814, p. 165: Sumatra (ref. not seen).
Distr.—Sumatra.

Capricornis sumatraensis swettenhami (Butl.).
Nemorhaedus swettenhami Butler, Proc. Zool. Soc. 1900, p. 675: Larut Hills, Perak.
Capricornis sumatraensis robinsoni Pocock, Abstr. Proc. Zool. Soc. 55, 1908, p. 12: Selangor (*see* also Proc. Zool. Soc. 1908, p. 185).
Distr.—Malay Peninsula.

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[1] *Bos bubalis* is found in a domesticated state throughout Malaysia in a number of local breeds and strains which it is not within the province of this paper to discuss in detail. They have horns of the *bubalis* rather than the *macroceros* form, but horns approximating to the latter type do occur, although I cannot personally testify to the local provenance of certain fine specimens of "*macroceros*" (or near it) said to be from the Peninsula. In Singapore and elsewhere one sees also a curly horned breed, imported from India. In my view no truly wild buffalo occurs in the Malay Peninsula south of the Isthmus of Kra, although individuals once in captivity can be seen in a semi-wild state in a few localities. In Treubia, XIV, 1934, p. 487, Dammerman examines the wild buffaloes of the Sunda Islands, and concludes that it must not be accepted without further investigation that they are the descendants of domesticated specimens run wild, although in some cases the herds seem to show the influence of domestic blood. They have a pleistocene and a more recent prehistoric ancestor.

[2] *Capricornis.* Revision, Pocock, Proc. Zool. Soc. 1908, p. 174; Journ. Bomb. Nat. Hist. Soc. XXII, 1913, p. 296. That *robinsoni* cannot be separated from *swettenhami* I have no doubt: *swettenhami* itself is only separable from *sumatraensis* on the average characters of a few specimens, and the species is so variable that it seems doubtful if the observed differences would be confirmed by a larger series.

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Family RHINOCEROTIDÆ.

Genus **RHINOCEROS** Linn. 1758

Rhinoceros sondaicus Desmar. Javan, or One-horned Rhinoceros.

Rhinoceros sondaicus A. G. Desmarest, Ency. Méth. (Mamm.), II, 1822, p. 399: Java.

Rhinoceros javanicus F. Cuv., Hist. Nat. Mamm. IV. livr. 45, 1824, pl. 309: Java (*n.v.*).

Rhinoceros inermis Less., N. Tab. Règne Anim. 1842, p. 159: (*n. n. fide* Sherb.).

Rhinoceros nasalis Gray, Proc. Zool. Soc. 1867, p. 1015: "Sumatra".

Distr.—Malay States; Sumatra; Java.

Rhinoceros sumatrensis.[1] Sumatran, or Two-horned Rhinoceros.

Rhinoceros sumatrensis sumatrensis Fisch.

Rhinoceros sumatrensis G. Fischer, Zoogn. ed. 3, III, 1814, p. 301: Sumatra. Ref. *fide* Sherborn.

Ceratorhinus niger Gray, Ann. Mag. Nat. Hist. (4), XI, 1873, p. 357: Malay Peninsula (not *R. niger* Schinz, 1845).

Distr.—Malay Peninsula; Sumatra; Borneo.

Family TAPIRIDÆ.

Genus **TAPIRUS** Brisson, 1762.

Tapirus indicus Desmar.[2] Malay Tapir.

Tapirus indicus A. G. Desmarest, Ency. Méth. (Mamm.) II, 1822, p. 410: Malay Peninsula.

Tapirus sumatranus Gray, Med. Repository, 1821: Sumatra (*n. v.*).

Tapirus malayanus Raffles, Trans. Linn. Soc. XIII, 1821, p. 270: Malacca.

Tapirus bicolor Wagner, in Schreber, Säugth. VI, 1835, p. 400: Malacca.

Distr.—Malay Peninsula; Sumatra.

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[1] *Rhinoceros sumatrensis* is the genotype of *Dicerorhinus* Gloger, 1841. A larger, northern race is certainly distinct (*lasiotis*), but on the limited material I have seen I cannot divide *sumatrensis* as defined above. If a Malayan form proves separable from a Sunda Island race, *R. blythi* Gray, 1873 (Tenasserim) is available. At one time a single rhinoceros of unknown species was well-known to be on the small island of Abang Besar in the Rhio Archipelago. Kloss gave me this information.

[2] *Tapirus indicus.* Genotype of *Acrocodia* Goldman, 1913.

INDEX TO GENERA

Aeromys, 120
Aethalops, 27
Arctictis, 99
Arctogalidia, 100
Arctonyx, 91
Asellia, 47
Atherurus, 188

Balaenoptera, 108
Balionycteris, 27
Bandicota, 186
Bos, 205

Capricornis, 206
Cervus, 201
Chaerephon, 58 ?
Cheiromeles, 60
Chilophylla, 48
Chimarrogale, 19
Chironax, 28
Chiropodomys, 184
Coelops, 47
Crocidura, 14
Cuon, 93
Cynogale, 102
Cynopterus, 25

Delphinus, 110
Dendrogale, 10
Dremomys, 147
Dugong, 189
Dyacopterus, 27

Echino-Sorex, 11
Elephas, 190
Emballonura, 31
Eonycteris, 28
Eptesicus, 53

Felis, 104

Galeopterus, 20
Glischropus, 51
Globicephala, 110
Glyphotes, 148
Gunomys, 186

Haeromys, 185
Hapalomys, 185
Harpiocephalus, 55
Helarctos, 89
Helictis, 91
Hemigalus, 101
Herpestes, 102
Hesperoptenus, 52
Hipposideros, 42

Hylobates, 63 1 – 11, TE
Hylomys, 12
Hylopetes, 116
Hystrix, 187

Iomys, 114

Kerivoula, 55

Lariscus, 145
Lepus, 111 57, TE.
Lutra, 92 50, 68 TE

Macaca, 66 12 – 2[illegible]
Manis, 111
Macroglossus, 28
Martes, 90
Megaderma, 34
Megaerops, 27
Menetes, 145
Meomeris, 109
Miniopterus, 57
Mops, 59
Mormopterus, 59
Muntiacus, 202
Murina, 55
Mus, 183
Mustela, 90 68, TE
Mycteromys, 185
Mydaus, 92 59, TE
Myotis, 48

Nannosciurus, 149
Nasalis, 83 46 – [illegible] TE
Nesolagus, 111
Nyctalus, 53
Nycteris, 36
Nycticebus, 88 66, TE

Orcaella, 109
Orcinus, 109
Otomops, 59

Paguma, 98 54
Paradoxurus, 95 53, 54, TE
Penthetor, 28
Petaurillus, 116
Petaurista, 112
Petinomys, 119
Phoniscus, 57
Physeter, 109
Pipistrellus, 50
Pithecheir, 186
Pithecus, 70 22 – 25
Prionodon, 94 54
Prodelphinus, 110

Panda 68 TE
[illegible] 57 TE

INDEX

Pteromyscus, 116
Pteropus, 22
Ptilocercus, 11

Rattus, 151
Ratufa, 120
Rheithrosciurus, 149
Rhinoceros, 207
Rhinolophus, 36
Rhinopoma, 31
Rhinosciurus, 147
Rhizomys, 150
Rousettus, 22
Saccolaimus, 32

Sciurus, 125
Scotophilus, 54
Simia, 60
Simias, 85

Sotalia, 110
Steno, 110
Suncus, 18
Sus, 190

Talpa, 13
Tamiops, 148
Taphozous, 32
Tapirus, 207
Tarsius, 86 66. T.E.
Tragulus, 193
Tupaia, 1
Tursiops, 110
Tylonycteris, 51

Viverra, 94 52-53 T.E.
Viverricula, 95 64. T.E.

Ziphius, 109

Ius. 15, 1940.